7th ANNUAL PRESS DIES & STAMPINGS ISSUE

JUNE, 1953

TOOLING and PRODUCTION

The Magazine of Manufacturing Management

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A handbook of press brake dies, punching attachments and press brakes
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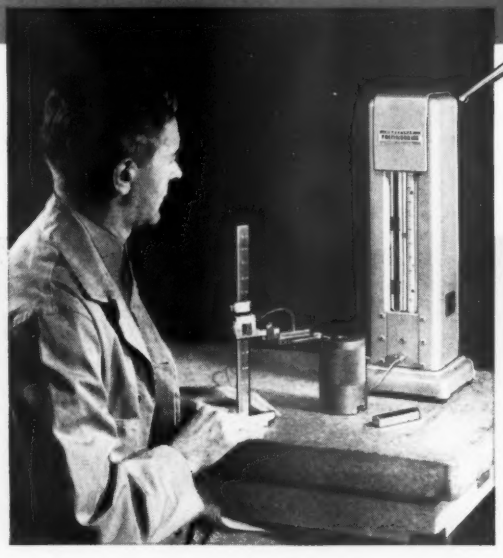

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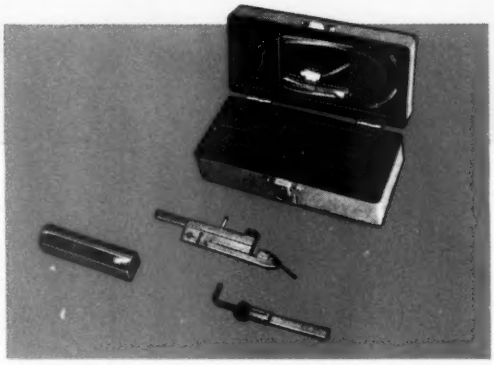

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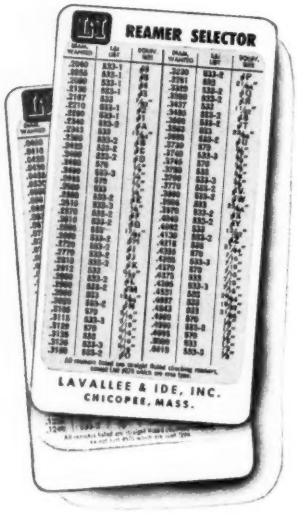

This sturdy pocket size Reamer Selector is a must for buyers and users of reamers. It lists 143 hole sizes from .0400 thru .5010 which can be reamed with STANDARD L&I Reamers. Includes catalog numbers and equivalent sizes for easy ordering.

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7

TOOLING and PRODUCTION

formerly
Tool-Die-Machine PROGRESS 1934-1941
TOOL & DIE JOURNAL 1941-51

Vol. XIX—No. 3 June, 1953

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They have the influence that enables them to adopt the ideas and the processes which TOOLING and PRODUCTION describes in every issue AND the authority to recommend, to specify and/or to buy everything that may be needed to reduce costs, increase production or improve quality. These men for whom, each month, our editors seek out or write TOOLING and PRODUCTION'S meticulously accurate stories of "Know-How" and "Tell-How" are T & P's exclusive Cycle of Buying Influence (CBI) in their plants.

Every copy is directed to these men by name, by title and by company address. Please see our CCA verification.

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Tooling and Production ★ Die Designing and Estimating ★ Plastics Molds
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An open letter to potential buyers of special machine tools and special tooling

Now, we can offer you greatly expanded facilities for the solution of your specific metalworking problems

FOR 55 years we've been designing and building special machine tools — as well as tooling and adaptations for standard equipment. But because of limited facilities, we could serve only a minimum number of you as customers in this ever expanding and increasingly important market.

Frankly speaking, we have decided that the time has come when we must be able to serve more of you. To do this job right, we are now completing a $5,000,000 plant expansion to handle this work — to help you solve your special production problems with special machinery and special tooling, big — or small.

Here are our qualifications:

EXPERIENCE: We've been in the business 55 years. During that time we have designed and built over 60,000 standard and special machine tools. *In recent years, our production of special machinery has ranged up to four million dollars annually.*

FACILITIES: Our new expansion is devoted exclusively to the production of special machinery. The new plant, built on a site covering 38 acres, is equipped with *over $2,500,000 worth of the very latest tools and equipment* — many of them custom-built for the job.

PERSONNEL: Our Special Machinery Division engineering section has at its command nearly *100 experienced, imaginative and practical design and project engineers* . . . men fully qualified in the sciences of applied mechanics, hydraulics, electronics and metallurgy . . . and metalworking.

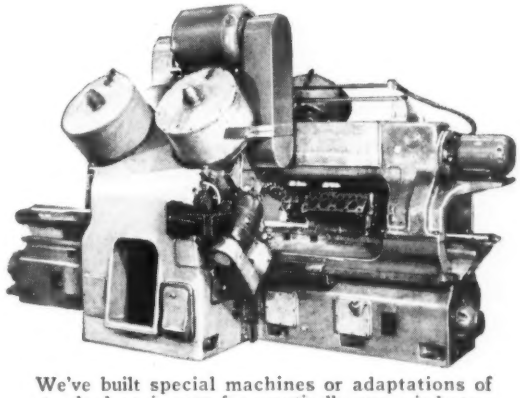
PERFORMANCE: Kearney & Trecker's Special Machinery Division is best recommended by its outstanding record of successfully solving many hundreds of unusual machining problems . . . problems that involved demands for high volume production, as well as exacting dimensional accuracy and fine surface finish.

RESPONSIBILITY: Our Special Machinery Division is an integral part of the Kearney & Trecker Corporation . . . and is fully supported by all its financial and physical resources. Any commitment for a product of this division is a commitment that fully involves the accepted reputation for responsibility and satisfaction that is Kearney & Trecker's.

We invite your inquiry

We'll be glad to provide you with any information we can . . . including sample machine specification sheets on typical installations, a brochure covering the expanded facilities of our Special Machinery Division, and details on our Customer Engineering Service. Furthermore, if you have special production machinery problems, have one of our senior Project Engineers analyze them, without obligation, of course.

Write, wire or phone the Special Machinery Division, Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.



We've built special machines or adaptations of standard equipment for practically every industry. Here is a photo of a transfer-type milling machine we designed and built for a major automotive manufacturer.

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Micrometer accuracy starts with Cincinnati Hydraulic Holddowns. They exert tons of pressure and automatically hold all thicknesses of work securely.

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They handle cold finished, or pickled and oiled sheets up to 10 gauge and hot rolled sheets up to ¼". Both management and operators are enthusiastic about their Cincinnati Shears.

Write for Shear Catalog S-6.

Photos courtesy The W. J. Holliday Company, Inc., Indianapolis, Indiana

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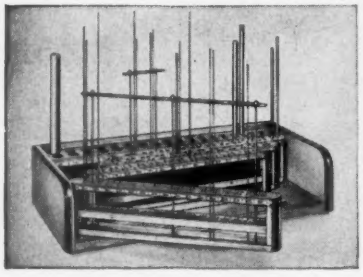
. . . Money Saving Accessories For Your Plant

Each of the accessories illustrated and described below was designed and built for a definite need and used in our own plant before being offered to industry. They require a relatively small investment, yet will save you money every day. For further information, write for the folder offered below.

DRILL ROD RACK

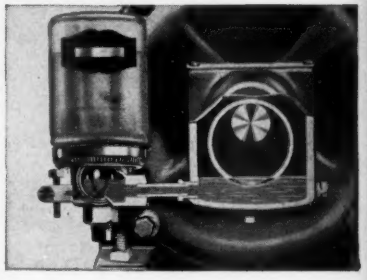


Eliminate trouble and waste effort with this modern method of storing drill rod. Put the Acro rack in a central location of each department and make it simple for each mechanic to select correct rod size in a hurry. It also provides a visual inventory for checking rod replacements.
Accommodates 26 letter sizes, 52 pieces; 47 fractional sizes, 138 pieces; 60 number sizes, 304 pieces. Fractional sizes graduated in 64ths from 1/32" to ½" and in 32nds from ½" to 1" included.

LEADER PIN OILERS

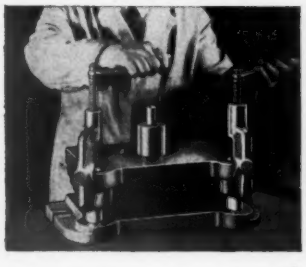
Eliminate wear on your die sets with these leader pin oilers. Acro Pin Oilers, as illustrated, fit over each leader pin and seals in place with a rubber neoprene washer. Each cup is filled with oil so each downward stroke brings bushing in contact with oil and each upward stroke distributes oil evenly over leader pins. Eliminate bushing wear, leader pin scoring, and maintains die accuracy. Die sets equipped with Acro Pin Oilers have run under tests for several weeks to a month without refilling.

AUTOMATIC LUBRICATORS



With this Acro lubricator, you can lubricate oil ring, capillary, ball or roller bearings on electric motors, blowers, lineshafts and similar bearings for periods as long as six months to one year with one filling. You can save 50 to 95 per cent in oil consumption, practically eliminate maintenance labor and burned out bearings due to faulty hand oiling and guesswork. In addition to savings effected in labor and maintenance, Acro lubricators soon pay for themselves in oil savings alone.

DIE SET PULLERS



The principle of the Acro Die Set Puller is to remove the punch holder from the die shoe by a straight upward pull, whereby punch holder travels upward from die shoe axially, leaving both leader pins simultaneously. This is accomplished only by use of the indexed screw wrenches which act as indicators, controlling the upward travel. This is an exclusive patented Acro feature, found only in Acro Die Set Pullers.

Free Data

covering each of these profitable accessories is included in our folder. Write for bulletin TP-52.

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Rugged Walsh presses made in 1907 are still operating at a profit.

For press recommendations without obligation
send sample or blueprint to Engineering Department,
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Gage & Machine Co., 4709 W. Kinzie St., Chicago 44.
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WALSH PRESS & DIE COMPANY

Need 52100 tubing for rush hollow parts jobs? *Order today—we'll ship tomorrow!*

ORDER 52100 tubing today—we'll ship it tomorrow from our mill stock of one hundred and one sizes!

A high-carbon chrome steel manufactured by the Timken Company, 52100 is a through-hardening steel in moderate sections and can often be used in place of more expensive steels. It can be heat-treated to file hardness and tempered back to any desired point.

52100 is available in sizes from 1″ to 10½″ O.D. for hollow parts jobs like these: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

As America's pioneer producer of 52100 tubing, the Timken Company has unequalled experience resulting in uniform high quality from tube to tube and order to order. Rigid quality control checks every step of production.

For immediate delivery of your less-than-mill-quantity orders, write, wire or call The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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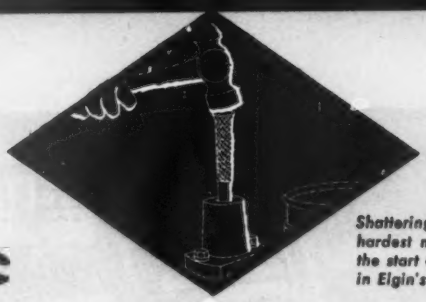


Shattering pure diamond bort, hardest material known, at the start of the crushing process in Elgin's laboratories.

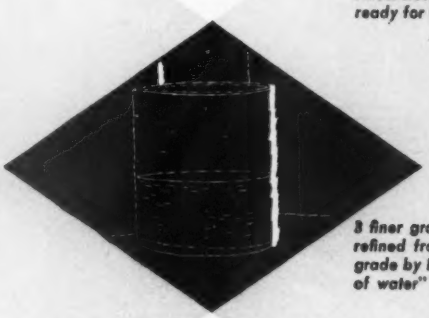
Here is how all Elgin Diamond begins . . . in an $8,000 handful of re diamond bort. For more than 10 years, every step of production, from bort to finished DYMO compound has been completely performed in the Elgin Diamond laboratories, under the control of Elgin technicians . . . a unique production arrangement permitting maintenance of absolutely rigid quality standards.

Results in hundreds of industrial applications have proved that DYMO finishing is the sure way to reduce costs and produce a better finish every time . . . in less time! Write for specific application data today.

Every day, more and more leading producers find that it's best to FINISH WITH DIAMOND . . . ELGIN DIAMOND.

Ask for a free demonstration!

Diamond powder is mechanically sieved into ten grades. The finest sieve grade shown here is ready for further processing.



3 finer grades are further refined from the finest sieve grade by Elgin's "layers of water" process.

Final inspection assures particle uniformity and grading accuracy—for finer, faster finishes at less cost!

ABRASIVES DIVISION

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

New "slant" on DELTA Drill Presses boosts output at Atlantic Service Co.

Easier cleaning, better lubricant flow, reduced operator fatigue are extra benefits for Brooklyn shop.

A gang set-up of eight Delta 14" Drill Presses mounted at an angle of about 30° and operated by one man, boosted output and made a healthy cut in costs for Atlantic Service Co., Brooklyn, N.Y. This production speeding hook-up was possible because versatile Delta Drill Presses *operate in any position:* upside down, sideways, at any angle.

All spindles in Atlantic's set-up are connected to a master shaft and move simultaneously. Parts to be drilled are held on adjustable jigs. As many as 100 holes are drilled in each piece.

The tilted table is easy to keep clean, improves lubricant flow, makes the operator's job much easier—all of which contribute to a competitively low production cost.

Why not work out your own money-saving slant... as thousands of resourceful shop men are doing? Your Delta dealer can help you—he's listed in your Classified Telephone Directory under "Machinery" or "Tools". Write for the latest Delta catalog. Delta Power Tool Division, Rockwell Manufacturing Co., 622F N. Lexington Avenue, Pittsburgh 8, Pa.

DELTA QUALITY POWER TOOLS

Another Product by **Rockwell**

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Currently, draw dies of Carboloy cemented carbide are speeding up production on everything from shoe eyelets to .30 cal. brass cartridge cases and 155 mm. brass and steel shell casings. Send coupon for details on carbide draw dies.

Carbide dies outdraw steel dies 10 to 20 times on shell cases

Field engineering — At your call, a Carboloy die expert will drop around to your plant and help solve your carbide die problems. Call him whenever you want on-the-spot answers on design and application of carbides in dies.

Die training school — Courses in design, application and maintenance of carbide dies are given free at Carboloy Die School. Plan to enroll your men now. Send coupon for information.

Dies equipped with Carboloy cemented carbide really stand up in production of steel shell cases. Even under terrific hour-after-hour continuous drawing, they wear 10 to 20 times longer than steel dies and deliver an extremely high finish.

Other drawing applications — similar benefits. Such benefits are not unusual from Carboloy drawing dies. On some applications, they'll outwear other dies by 50 to one. The same holds true for blanking, forming and piercing dies made of Carboloy cemented carbide.

Naturally, when dies wear like this, you get greater production with less downtime and maintenance . . . fewer rejects and less finishing . . . cash savings all down the line.

Whether you make or use press dies, simple or complex, for any die operation, explore the possibility of applying Carboloy cemented carbide to those dies. You can order Carboloy cemented carbide in finished or in rough form from Carboloy Department. On blanking dies, order rough carbide direct from Carboloy Department to be finished in your own or tool maker's die room. Expert Carboloy die specialists will assist you in carbide die design and application.

To get a better idea of the wide range of carbide dies and free Carboloy die services, send coupon.

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DEPARTMENT OF GENERAL ELECTRIC COMPANY

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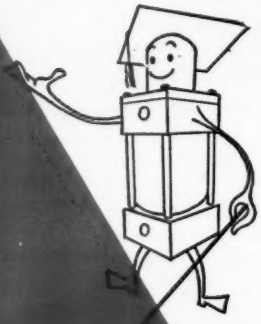

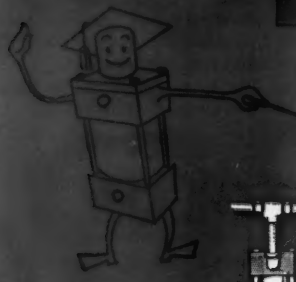

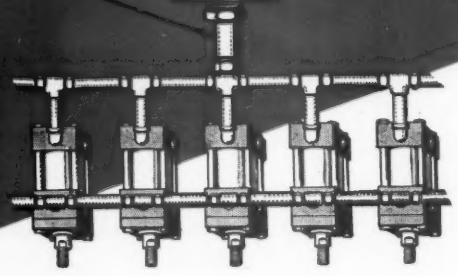

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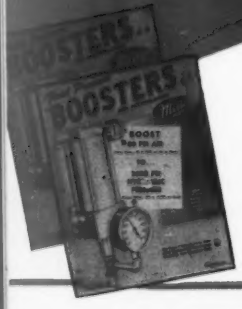

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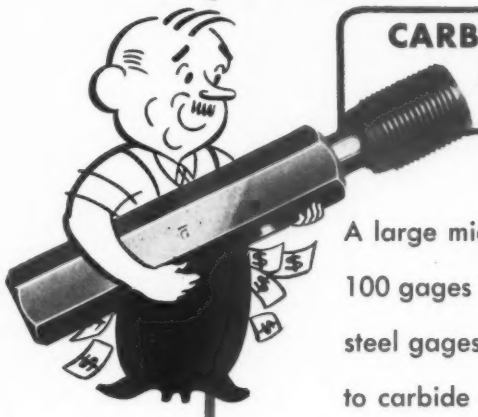

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puts over $20,000.00 annually in our pocket . . .

A large midwestern motor manufacturer, who has about 100 gages in constant use, found it necessary to check his steel gages for accuracy every day. Changing from steel to carbide gages eliminated this daily checking requirement and he now checks his carbide gages once every 12 weeks. It costs $ .85 to check each gage and based on a 250 day, 50 week year his annual savings with carbide gages are $20,896.00 on checking costs alone.

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CARBIDE, CHROME PLATED, AND STEEL GAGES
• CARBIDE ROTARY FILES •
ALSO, FACILITIES AND SKILLED PERSONNEL AVAILABLE FOR PRECISION PARTS PRODUCTION

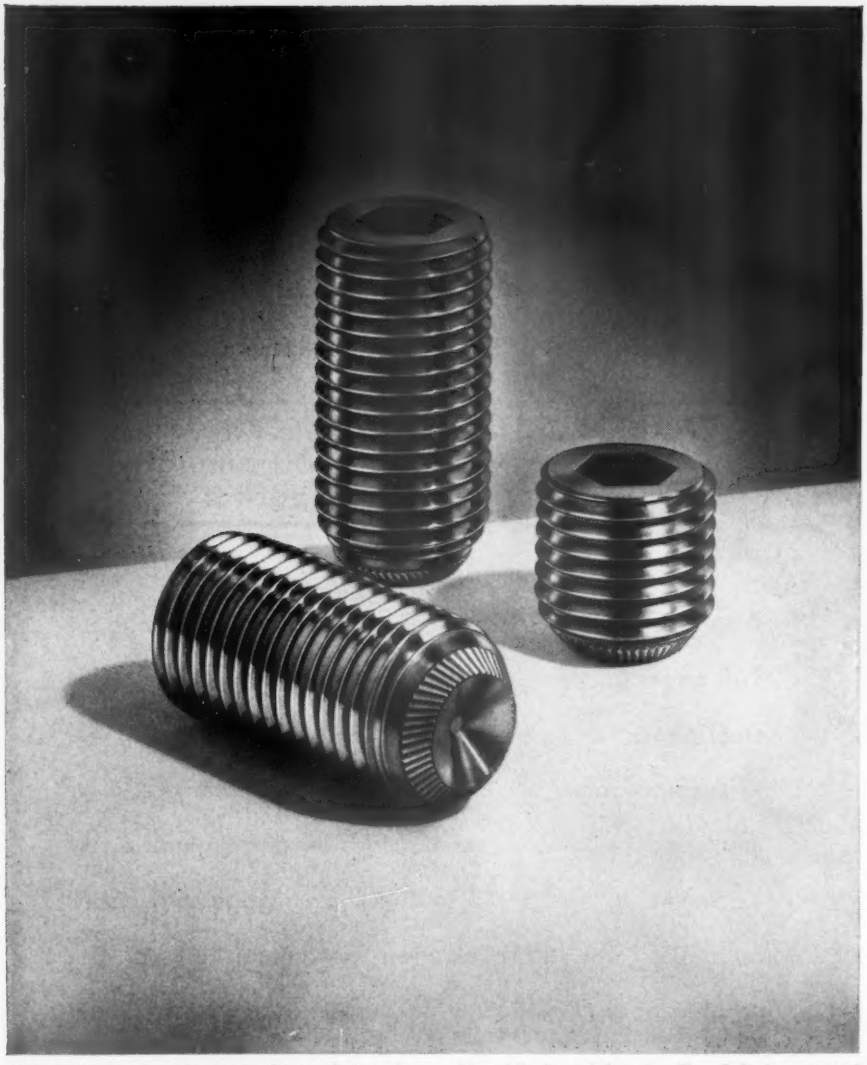
For further information on how to reduce inspection costs with carbide gages, send for booklet—"If steel gages were FREE."

THE PLUS IN PRECISION

Lincoln Park INDUSTRIES, INC.

1719 FERRIS AVENUE • LINCOLN PARK 25, MICHIGAN

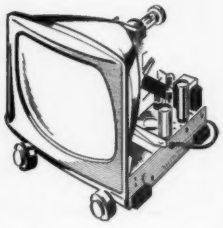
SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS



UNBRAKO SELF-LOCKING SOCKET SET SCREWS feature the following advantages: knurled cup point that won't work loose; accurate hex socket for nonslip, positive drive; fully formed threads—Class 3 fit; heat treated alloy steel for strength; standard sizes—#4 to 1"—in a full range of lengths.

Our Fiftieth Year

A START FOR THE FUTURE



USE UNBRAKO SELF-LOCKING SOCKET SET SCREWS wherever ordinary cup point set screws are used . . . on radios, television sets, electronic equipment.

On refrigerators, washing machines, and other household appliances.

On power mowers, power saws and other power tools.

9 times out of 10 a standard UNBRAKO will do the job

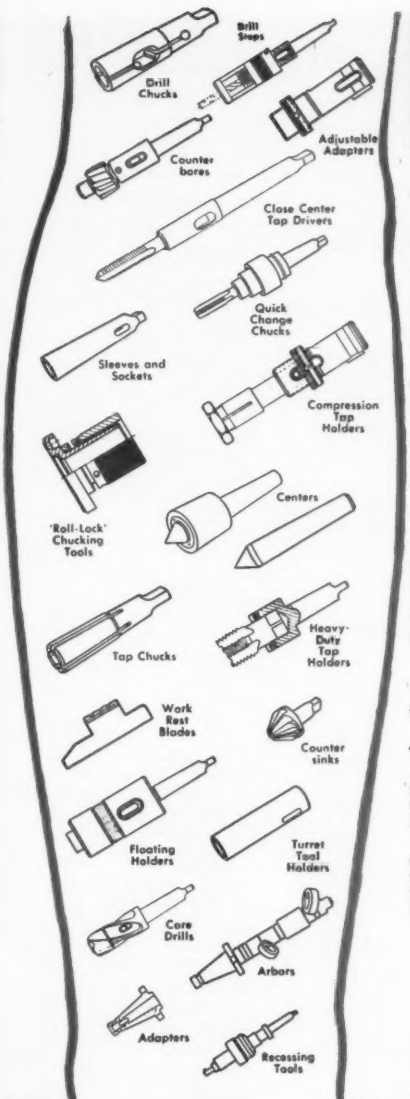
A special socket screw may not be necessary, a standard UNBRAKO usually does the same job—much cheaper. Your local industrial distributor stocks Standards. He gives immediate attention to your requirements, and such extras as special delivery to your plant. Write for UNBRAKO Standards. SPS, Jenkintown 36, Pa.

Write for UNBRAKO Standards

UNBRAKO® SOCKET SCREW DIVISION

SPS
JENKINTOWN PENNSYLVANIA

FOR PRODUCT INFORMATION USE CONVENIENT INFORM-A-GRAM CARD



ACCURACY, SPEED, ECONOMY on END-CUTTING OPERATIONS

with S-J SCULLY-JONES

COUNTERBORES · COUNTERSINKS · CORE DRILLS

These Cutters and Drivers have rigidity of a one-piece tool. Shanks and holes ground concentric to assure true-running cutters; helps produce work to specifications and reduce rejects.

Cutters are solid High-Speed Steel, carefully heat treated and ground to prolong life of cutting edges; assures fast, continuous production; reduces "down time" for re-grinding.

Standard Stub Taper shanks on cutters are easy to insert and eject, saves time changing cutters. Tangs on shanks provide a positive drive; eliminates slipping and tool damage.

1 S-J Counterbore Cutters—solid, High-Speed Steel or Tungsten Carbide Tipped.

2 S-J Countersinks—solid or piloted; **solid,** H.S.S. —with 60, 82 or 90° included angle.

3 S-J Counterbore Drivers—Shown with cutter and pilot. Drive S-J Counterbore Cutters, Countersinks, Core Drills and tools having Standard Stub Taper Shanks.

4 S-J Stub Taper Turret Tool Holders—Shown with countersink and pilot. Eliminate need for conventional type holders and shorten projection between turret and work. Designed for holding S-J Counterbore Cutters, Countersinks, Core Drills and any similar tools having Standard Stub Taper Shanks.

5 S-J Core Drill Cutters—solid H.S.S., 4 flutes, 20° spiral—for enlarging and truing drilled, cored or punched holes. Quickly enlarge holes, because 45% of diameter is cutting.

6 S-J Core Drill Holders—Used where chip removal is a problem. Shown with cutters; 4 flutes, 20° spiral. **Style 1** for deep hole drilling. **Style 2** for shallow hole drilling. May be run through bushing.

7 S-J Style "B" Core Drill Holders—Used where chip removal is no problem. Shown with cutter; shorten overhang and assure rigid set-up. **Only 4** holders required to drive the 25 cutters.

Scully-Jones AND COMPANY

WRITE FOR BULLETIN No. 5-50
Shows complete information on S-J Counterbores, Countersinks and Core Drills.

R5904 1923 S. ROCKWELL ST., CHICAGO 8, ILLINOIS

YOU GET LOW COST FAST ACCURATE PRODUCTION WITH OUR STANDARD AND SPECIAL TOOLS

the "ARMS and HANDS" for your MACHINE TOOLS

If you think of a Lathe, Mill, Multi-Spindle Machine, or other Machine Tools as being a human body, supplying power to the parts of the body doing the actual work, then Scully-Jones tools represent the "Arms and Hands".

A YEAR-ROUND "TOOL SHOW"

You can see the S-J Standard Tools (sketched in the column at the left) on display or in operation the year-round, at the Scully-Jones plant. For year-round reference too, you'll find complete information on these and other tools, in the S-J Catalog 600—yours on request, on your company letterhead.

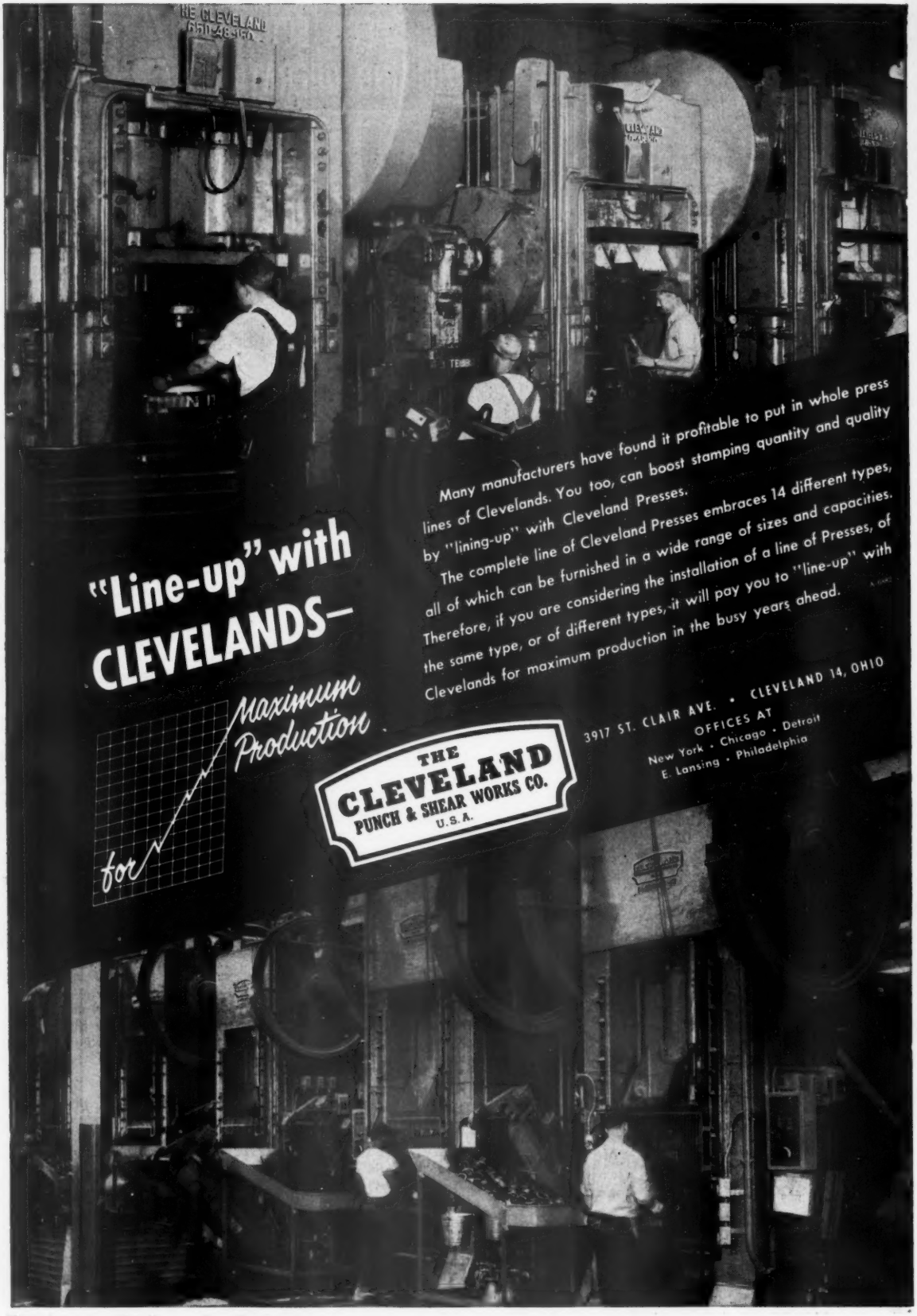
These "arms and hands" — as we like to call them — will help you equip your machine tools for low cost, fast, accurate production.

Whether you select Scully-Jones Standard or Special Tools you can be confident of getting the best that can be produced — the result of 40 years' experience, engineering research, modern equipment, correct materials and expert workmanship. Recently Scully-Jones manufacturing facilities have been further expanded to give you more reasonable deliveries.

Whenever your tooling problems or design programs require outside service, S-J Engineering and Design Service has "heads and hands" to help you. Whether large or small, let us discuss your engineering problems and design programs.

For quick action see the nearest Scully-Jones representative or contact us direct.

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS


"Line-up" with
CLEVELANDS—
Maximum
Production
for
Many manufacturers have found it profitable to put in whole press lines of Clevelands. You too, can boost stamping quantity and quality by "lining-up" with Cleveland Presses.
The complete line of Cleveland Presses embraces 14 different types, all of which can be furnished in a wide range of sizes and capacities. Therefore, if you are considering the installation of a line of Presses, of the same type, or of different types, it will pay you to "line-up" with Clevelands for maximum production in the busy years ahead.
THE
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PUNCH & SHEAR WORKS CO.
U.S.A.
3917 ST. CLAIR AVE. • CLEVELAND 14, OHIO
OFFICES AT
New York • Chicago • Detroit
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FOR PRODUCT INFORMATION USE CONVENIENT INFORM-A-GRAM CARD

DIECO alone OFFERS YOU PROOF OF PLUS-PERFORMANCE

"DIECO Die Springs outperform others 3 to 1 and better!", says industry.

". . our die spring purchases reduced 70%, and maintenance costs down 75% on 2 refrigerator liner dies. Also 16-hr production bonus per week!", claims a leading refrigerator manufacturer.

". . . reduced thickness of our die sets due entirely to 'greater travel' of DIECO Die Springs!", says famous appliance manufacturer.

". . no more troubles since we switched to DIECO Die Springs and Application Service!", states major automobile manufacturer.

DIE-CO
Springs
The answer to your die spring problems! Here's why DIE-CO Die Springs are capable of outperforming others 3 to 1 and better.
DIE-CO
THE DIE SUPPLY COMPANY
GENERAL OFFICES
1400 BROOKPARK ROAD • CLEVELAND 9, OHIO
BULLETIN 1953

INDUSTRY DEMANDS DIECO DIE SPRINGS BECAUSE . . .

DIECO Die Springs guarantee **proven** increases in production, less down-time, lower maintenance expense and bigger savings in total die spring purchase cost. Learn why DIECO Die Springs are **better.** Investigate DIECO's Die Spring Application Service backed by **20 years field experience.** See DIECO's handy price list of nearly **500 stock sizes.**

DIECO

Get the facts . . . send for your DIECO Spring Catalog NOW

The DIE SUPPLY Co.

CLEVELAND 9: 1400 Brookpark Rd. ★ SHadyside 1-9000 ★ TWX-CV-202
PITTSBURGH 6: 122 S. Sheridan Ave. ★ EMerson 1-0440
DAYTON 4: The Die Supply Sales Co., 311 Vermont Ave. ★ MI. 9691 ★ TWX-DY-85
BUFFALO 1: Die Supply Corporation, 234 Carolina St. ★ MAdison 1964
ST. LOUIS 13: Scott Special Tools, Inc., 1252 N. Kingshighway ★ FOrest 3454

The Die Supply Co., 1400 Brookpark Rd., Cleveland, O. Please send me DIECO Spring Catalog 1953-T at no cost or obligation to me.

Name .....
Company .....
Address .....
City ..... State .....

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

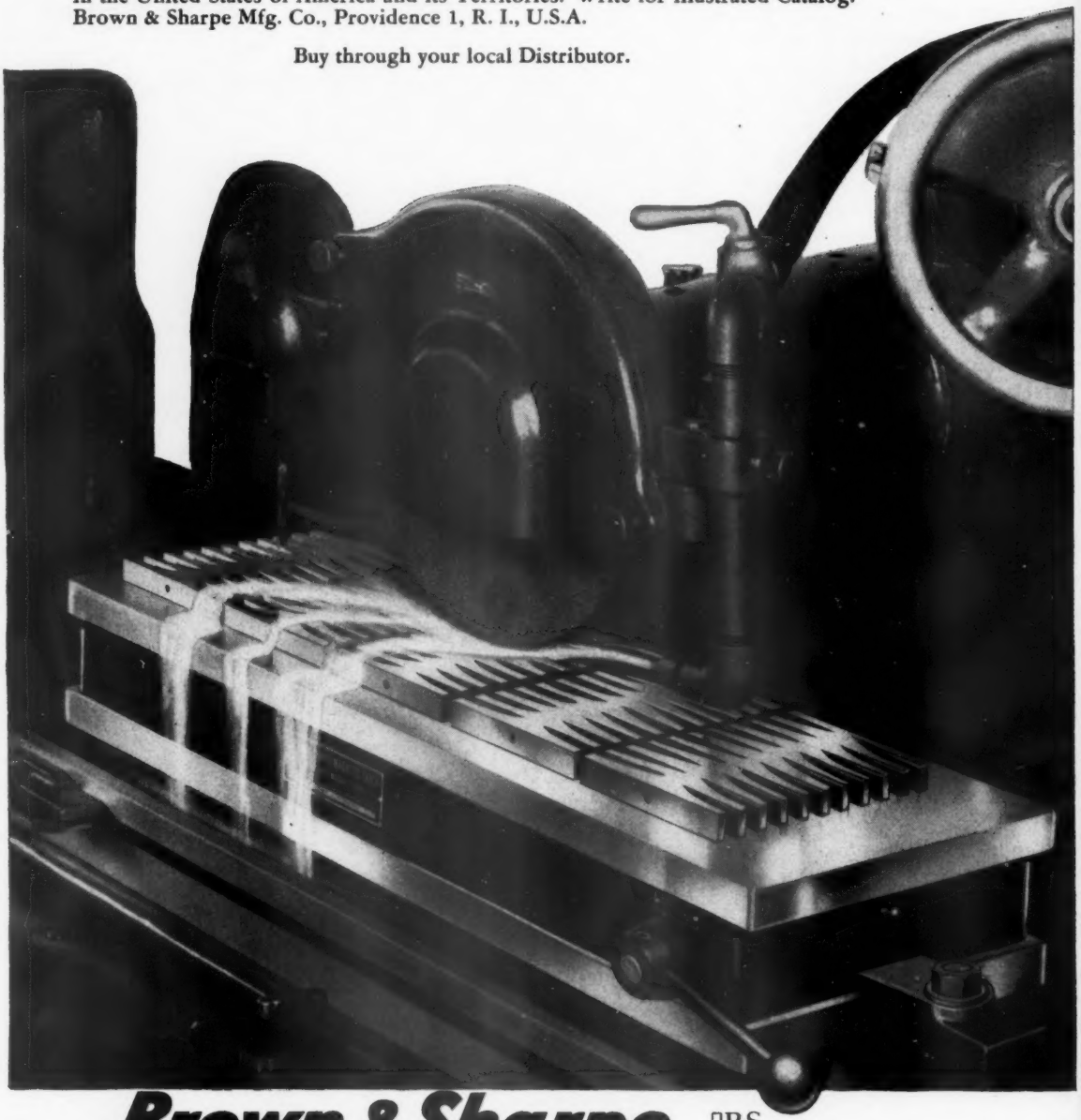
Work Holding Short-cut that never Short-circuits . . .

Permanent Magnet Chucks

Wet grinding, as well as other light machining operations and inspecting, is *safely* accomplished on Brown & Sharpe Permanent Magnet Chucks. No electric current is used . . . no danger of wires short-circuiting or power failure. Just shift a lever and magnetic power holds work securely for as long as desired. Completely self-contained and portable, you can use one chuck for several machines, or on the bench.

Complete line of 11 sizes in both rectangular and rotary models. For sale only in the United States of America and its Territories. Write for illustrated Catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

Buy through your local Distributor.



Brown & Sharpe B·S

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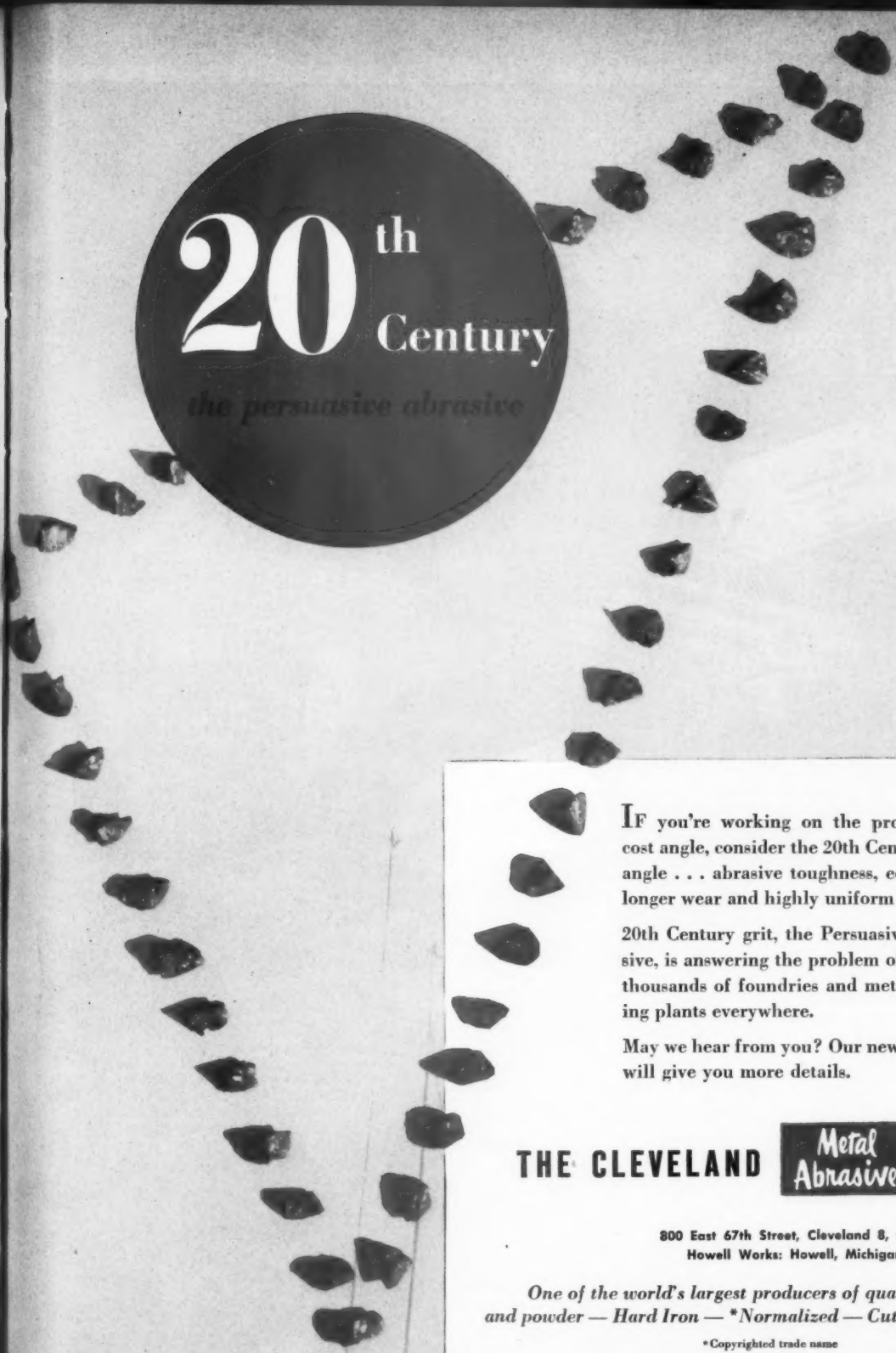


IF you're working on the production cost angle, consider the 20th Century triangle . . . abrasive toughness, economy, longer wear and highly uniform quality.

20th Century grit, the Persuasive Abrasive, is answering the problem of cost in thousands of foundries and metal-working plants everywhere.

May we hear from you? Our new catalog will give you more details.

THE CLEVELAND Metal Abrasive CO.

800 East 67th Street, Cleveland 8, Ohio
Howell Works: Howell, Michigan

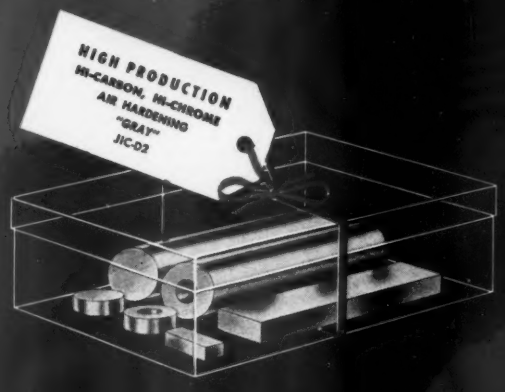
*One of the world's largest producers of quality shot, grit and powder — Hard Iron — *Normalized — Cut Wire — Cast Steel*

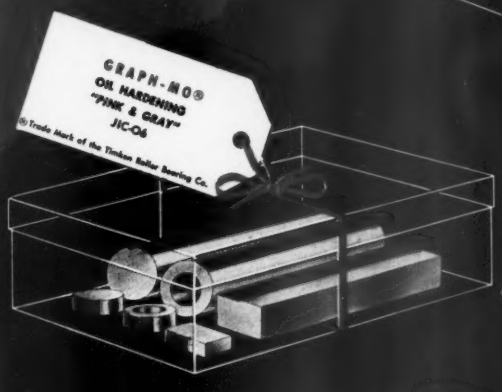
*Copyrighted trade name

MILNE

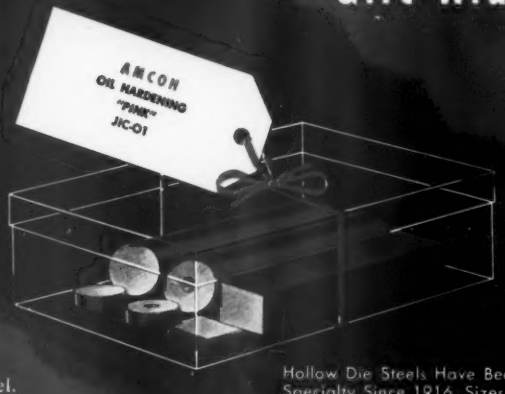
HOLLOW & SOLID

TOOL STEELS . . .





. . . are unforgettably "Gift Wrapped*"



WIDE RANGE OF GRADES
—ALL KOLORKOTED

Insulated Against Confusion by Full Length Identifying Kolorkote and Heat Treatment Card of Matching Color

It's just about impossible to lose, confuse or abuse a piece of Milne's Tool Steel. It's completely "gift-wrapped" . . . spray painted in permanent color that instantly identifies the grade. With every shipment goes a heat treatment card of a color that matches the steel.

You eliminate costly errors, delays, confusion and phone calls. Inventory control, scrap identification and stock movements are simplified.

You know what you have . . . how to treat it . . . as long as you have it.

Hollow Die Steels Have Been a Milne Specialty Since 1916. Sizes 16" OD x 12" ID to 2" OD x 1" ID Rough Turned. Smooth Bored.

Write for Milne's New Hollow Die Catalog which includes a section on the new cost-cutting Graphitic Hollow Die Steel.

Across the continent 39 steps cut Milne steel to order. Large or small quantities.

AM-25

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BOSTON
NEW BRITAIN, CONN.
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CLEVELAND
DAYTON
SAN FRANCISCO
ATLANTA

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DETROIT
ROCHESTER
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LOUISVILLE
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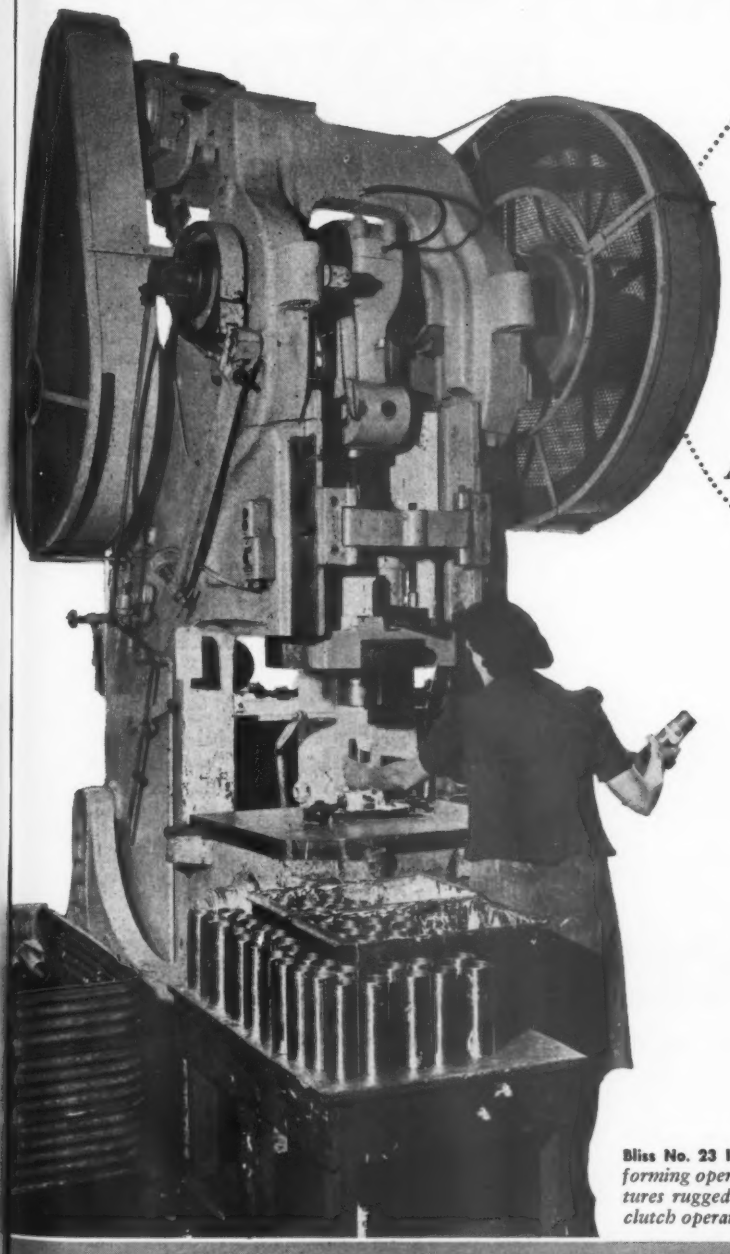
SALES AGENTS
TAYLOR-SPOTSWOOD OF CALIF. LOS ANGELES
PACIFIC MACHINERY & TOOL STEEL CO. PORTLAND, OREGON
VINSON SUPPLY CO. DALLAS, TEXAS
D. A. JACKSON, INC. SALT LAKE CITY
GEOFFROY-LANE, INC. DENVER
SANDERSON-NEWBOLD, LTD. MONTREAL-TORONTO

Complete line of tool steels . . . Wide range of grades and sizes.

A. MILNE & CO.
Established 1887
745 WASHINGTON ST., NEW YORK 14, N.Y.
American Leading Tool Steel Specialists
Complete Line Of Tool Steels—Hollow and Solid

THE TREND IS TO MORE STAMPINGS WITH BLISS PRESSES



Not a dime spent on maintenance in 8 years in Snyder's PHILADELPHIA ALL-BLISS press shop

Snyder Manufacturing Co. of Philadelphia discarded all their old presses and equipped their shop 100% with Bliss inclinable and straight-side presses back in 1945.

That was a significant decision for the world's largest manufacturer of television and auto radio aerials.

Results? In the eight years that Snyder's press shop has been all-Bliss, they have not had to spend a *single* dime on maintenance of the 25 Bliss presses.

And, as the press room accident rate dropped to zero with the Bliss presses, operators found they could run the presses faster.

The Snyder story is not unique. Bliss is the dominant factor in press room after press room. For a complete press room or a single press for a given job, you'll find it's best to call in Bliss.

Bliss No. 23 Inclinable Press, *used by Snyder for forming operations on television accessories, features rugged construction, fast and dependable clutch operation.*

E. W. BLISS COMPANY, CANTON, OHIO

U. S. plants at Canton, Toledo, Salem, Ohio; Hastings, Michigan

E. W. Bliss (England) Ltd., Derby, England

E. W. Bliss Company (Paris), St. Ouen sur Seine, France

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. West Coast Representatives: Moore Machinery Company, Los Angeles and San Francisco; Star Machinery Company, Seattle. Other Bliss representatives throughout the world.

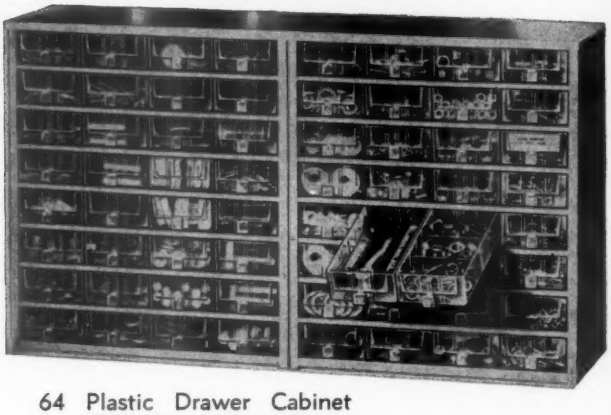
BLISS

ON YOUR PRESS IS MORE THAN A NAME...IT'S A GUARANTEE!

NOW

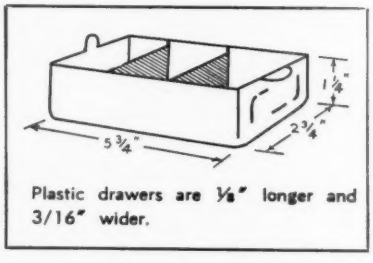
JIFFY CABINETS WITH METAL OR PLASTIC DRAWERS

- **7 useful cabinet sizes**
- **Aluminum or see-thru plastic drawers**
- **Individual drawer guides**
- **Removable drawer-dividers**
- **Safety catch on back of each drawer to prevent accidental spilling of contents**



64 Plastic Drawer Cabinet
(192 Compartments)

Index label and 2 removable drawer dividers for each drawer.



Plastic drawers are ⅛" longer and 3/16" wider.

HANDIEST CABINET EVER BUILT FOR STORING SMALL ITEMS

No more frantic searching for misplaced items at home, shop, office or factory! EVERYBODY needs this convenient storage cabinet where small parts and supplies can be kept indexed, orderly, clean and easy-to-find. Your Jiffy Cabinet holds bolts, nuts, nails, screws, washers, drills, tools, repair parts, carbide tips, labels, radio parts, film . . . plus hundreds of other small, easily misplaced items! Attractive baked-on, silver-gray hammer-finish steel frame with rubber feet that won't mar any surface.

CLIP AND MAIL TO: HANDY PRODUCTS, P. O. BOX 2447, CLEVELAND 12, OHIO

PLEASE SEND IMMEDIATELY THE QUANTITY AND SIZE JIFFY UNIT LISTED BELOW

PLASTIC Drawer Cabinets ☐ 64 Drw. @$24.95* ☐ 48 Drw. @$20.95* ☐ 32 Drw. @$12.95* ☐ 24 Drw. @$10.95* ☐ 16 Drw. @$7.75* ☐ 12 Drw. @$5.95* ☐ 8 Drw. @$4.25*

METAL Drawer Cabinets ☐ 64 Drw. @$24.95* ☐ 48 Drw. @$19.95* ☐ 32 Drw. @$12.95* ☐ 24 Drw. @$9.95* ☐ 16 Drw. @$7.95* ☐ 12 Drw. @6.95* ☐ 8 Drw. @$4.95*

WE PAY ALL SHIPPING COSTS

NAME .....
STREET .....
CITY ..... ZONE ..... STATE .....
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☐ Open Account, Purchase Order Enclosed.
☐ Check or Money Order Enclosed.
No. C.O.D.'s, Please.
*Ohio Customers Add 3% Sales Tax.

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CUT BETTER THREADS AT LOWER COST!

RADIAL

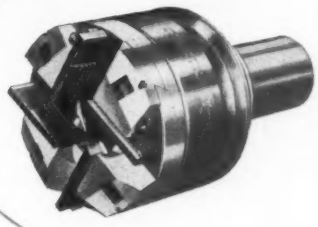
These Die Heads, with *ground thread* chasers, do an outstanding job on large or small lots, in pitches ranging from extremely fine to coarse multiple Acme.

They have an over-all capacity of from No. 8 to 4¼".

They require no more than the proper chasers to cut either right- or left-hand threads.

They are easy to install and simple to handle. For almost half a century of continuing development and improvement, J & L Dies and Chasers have been the answer to threading jobs throughout the world.

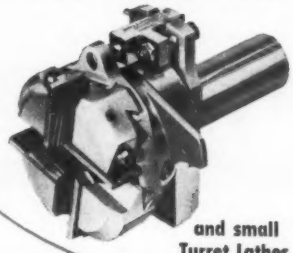
TANGENT



J & L Tangent Chaser Die Heads, with *ground thread* chasers, are rugged, dependable, time-tested tools. They are production engineered to produce better threads at speeds limited only by the material being threaded. Capacities are from No. 4 to 2".

There is a J & L Tangent Chaser Die Head engineered for your requirement. Stationary types are available for turret lathes or any machine where the tool does not turn. Revolving types are for automatic screw machines, drill presses, threading machines, or any machine where the tool is held in a live spindle.

For B&S AUTOMATICS and small Turret Lathes



For high production, quality threading on B & S Automatics and small turret lathes. Their simple design and careful workmanship assure repetitive accuracy with long runs between chaser grinds.

No. 16-S is for use on B & S No. 00, 00G, 0 and 0G and small turret lathes. They have "DUALIFE" radial type *ground thread* chasers with two cutting edges for maximum use between grinds.

No. 18-S is for B & S No. 0, 0G, 2 and 2G and the No. 19-S, with wider range, for B & S No. 2 and 2G. These dies use *ground thread* tangent type chasers.

P.S. *Write to Dept. 710 for catalog!*

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 519 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L DIE HEAD DIVISION

SEE ADVERTISERS INDEX. BACK OF BOOK. FOR INFORM-A-GRAM KEY NUMBERS

small in size but

BIG

in opportunity for SAVINGS

Just figure your assembly expense as compared to total production cost, and you'll see why. In some products it runs as high as 75%.

Cutting assembly costs is Parker-Kalon's specialty. You get a two-way savings. First, the Self-tapping Screw method, originated by P-K, permits you to save by eliminating needless operations. Second, with certified Self-tapping Screws of P-K guaranteed quality, you can make sure *planned* savings *pay off* on the assembly line.

A P-K Assembly Engineer will be glad to help you start making savings you've been missing. He'll call at your request. Parker-Kalon Corporation, 200 Varick St., New York 14.

PARKER-KALON®

Sold through Industrial Distributors, the Supply Specialists that serve you

The Original **SELF-TAPPING SCREWS**

GET THIS NEW GUIDE TO LOWER ASSEMBLY COST

Filled with facts you need to make sure of a two-way saving when you plan assemblies. Ask your P-K Distributor, or write Parker-Kalon for Form 475-D.

*This mark △ on every P-K Self-tapping Screw identifies it as genuine.

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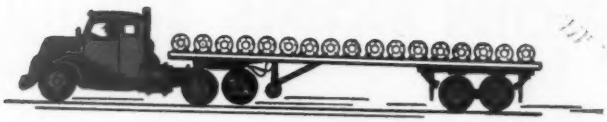
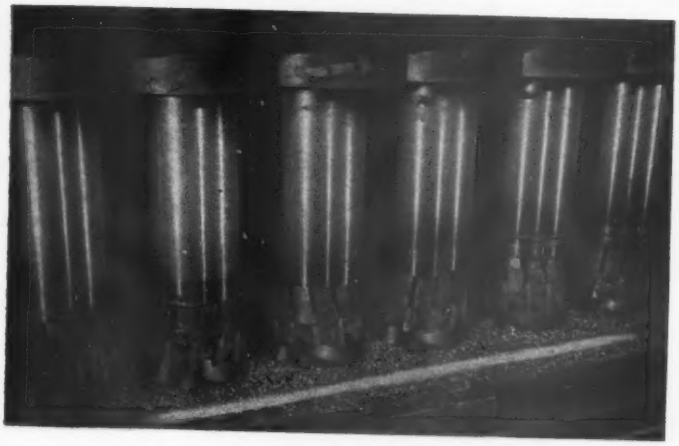


OUNCES OF WESSONMETAL CEMENTED CARBIDE!

TONS OF PRODUCTION!



ACTUAL JOB

Farm Implement Mfg. Co.

Machine.....Ingersoll Boring Mill—6 spindle
Part.....Cylinder block
Operation.....Rough cylinder bore
Tools.....3 R.H. and 3 L.H. Wesson Fine Pitch Cutters—3.480 dia.—12 Wessonmetal Solid GI Blades
Speed.....148 S.F.M.
Stock Removel...3/16"
Feed.....10" per min.—.063 per revolution
Length of Cut....8⅞"

OVER 300% DOLLAR SAVINGS PER TOOL

OLD METHOD		NEW WESSON METHOD	
Pieces per Grind	836	Pieces per Grind	3160
Cost of Tool	$49.68	Cost of Tool	$172.80
Grinding Cost per sharpening	$11.70	Grinding Cost per Sharpening	$8.78
Tool Cost per 100 Pieces	$2.588	Tool Cost per 100 Pieces	$0.642

On only one machine with Wesson Tools Savings of over $900 per year

HOW IS YOUR PRODUCTION SCORE CARD!

Write today for folder on Wesson's educational, full color, sound movie—"This Carbide Age."

WESSONMETAL Cemented Carbide

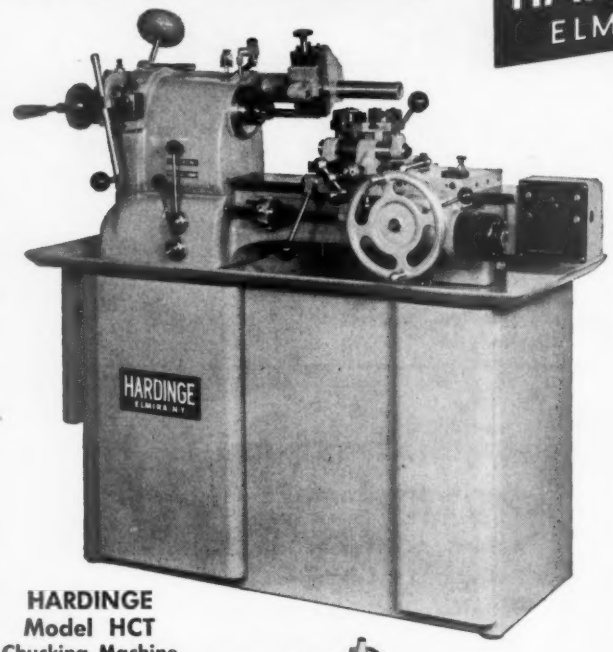
WESSON METAL CORPORATION
LEXINGTON, KENTUCKY
Affiliated with WESSON COMPANY, Detroit, Mich.

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

Precision
PRODUCTION MACHINES

HARDINGE
ELMIRA, N.Y.

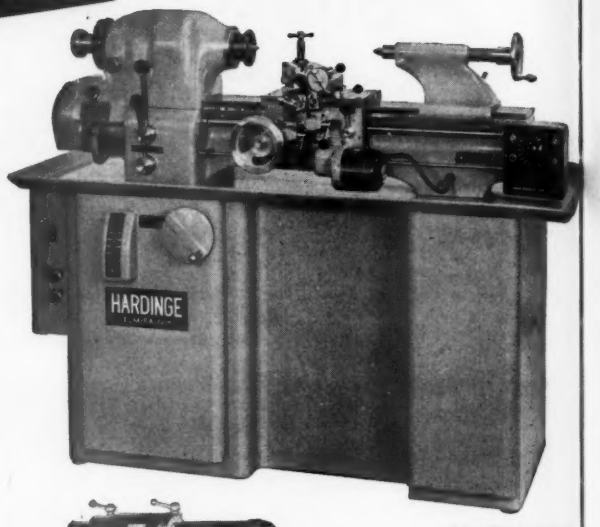
Precision
TOOL ROOM MACHINES



HARDINGE
Model HCT
Chucking Machine with Production Threading Head

Also Model HC Chucking Machine without Production Threading Head

HARDINGE
Model DSM 59
Second Operation Machine



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Model HLV
Tool Room Lathe

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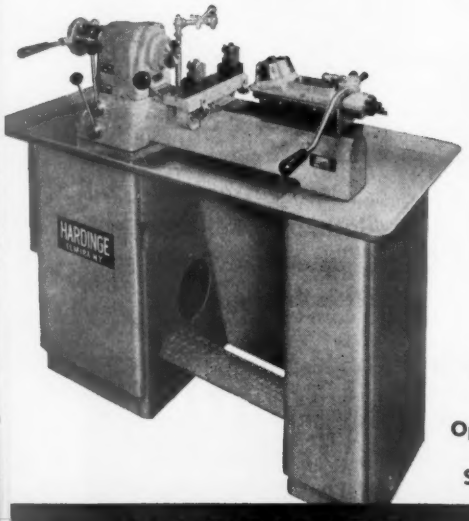

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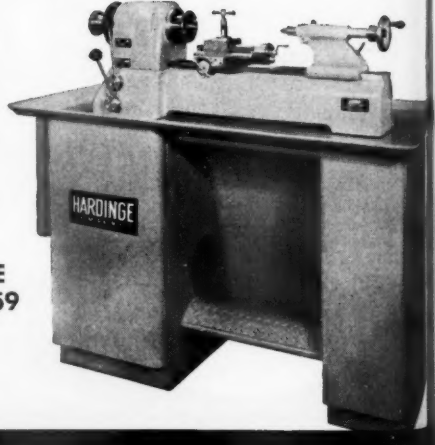
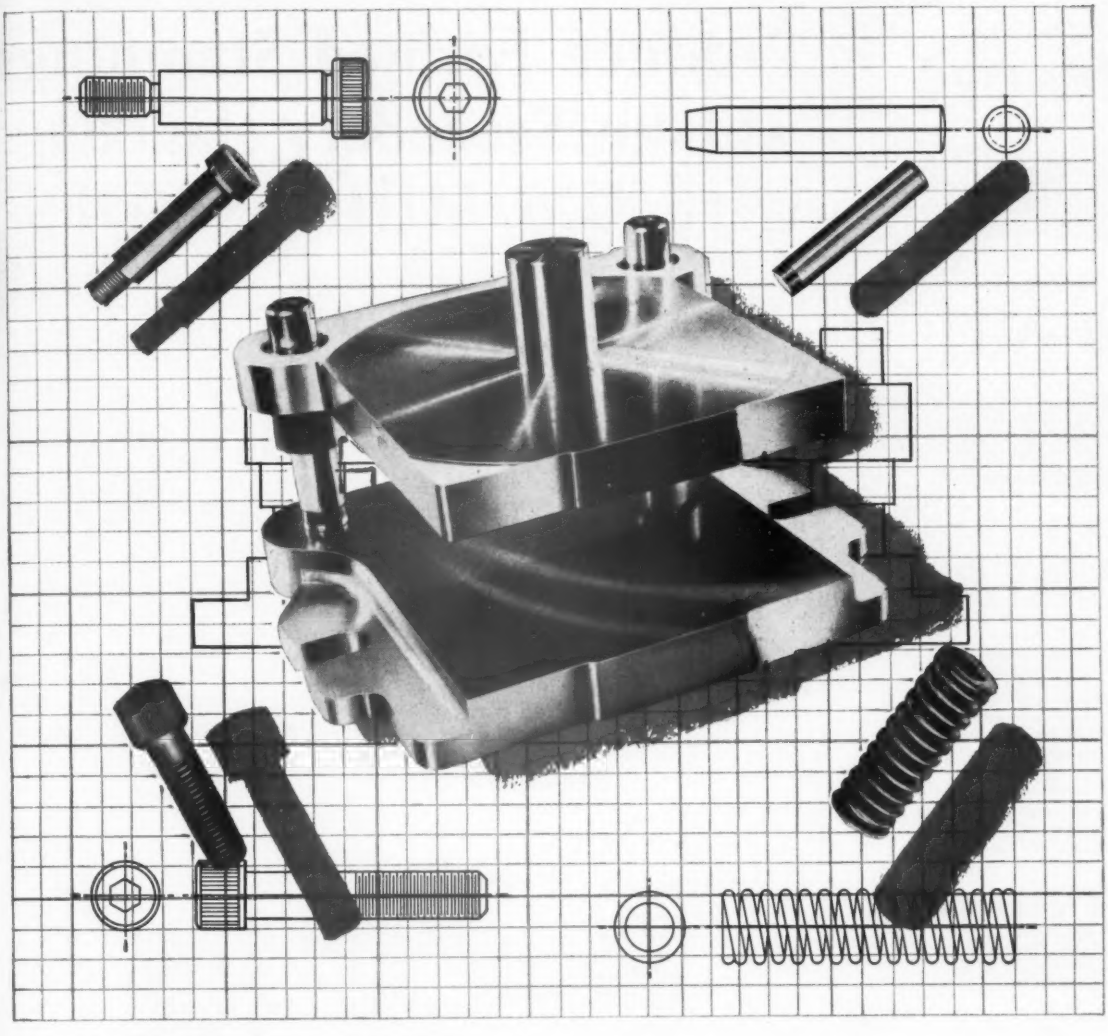


HARDINGE
Model VBS
Second Operation Machine with Stationary Collet

HARDINGE
Model DV 59
Lathe

HARDINGE BROTHERS, INC., ELMIRA, N. Y.



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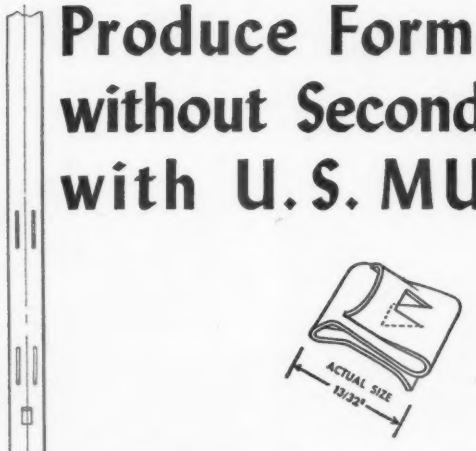

The sequence of operations for the part illustrated is as follows:

1. Pierce, shear and emboss in die head.
2. Cut-off blank from strip, using cut-off slide.
3. Preform around movable and stationary form posts.
4. Finish form around stationary form post, with movable form post withdrawn.

The small electrical part shown in the drawing above is produced from .018" x 5/16" copper in coils at the rate of 125 pieces per minute in a No. 28 U. S. Multi-Slide® similar to the machine shown in the photograph below.

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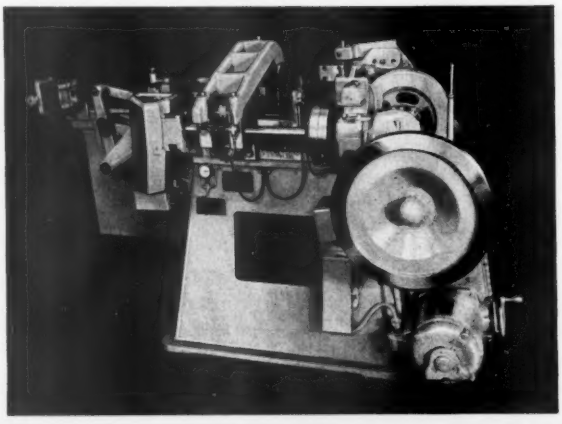
Bulletin No. 15-P contains complete specifications for U. S. Multi-Slide Machines. May we send you a copy?



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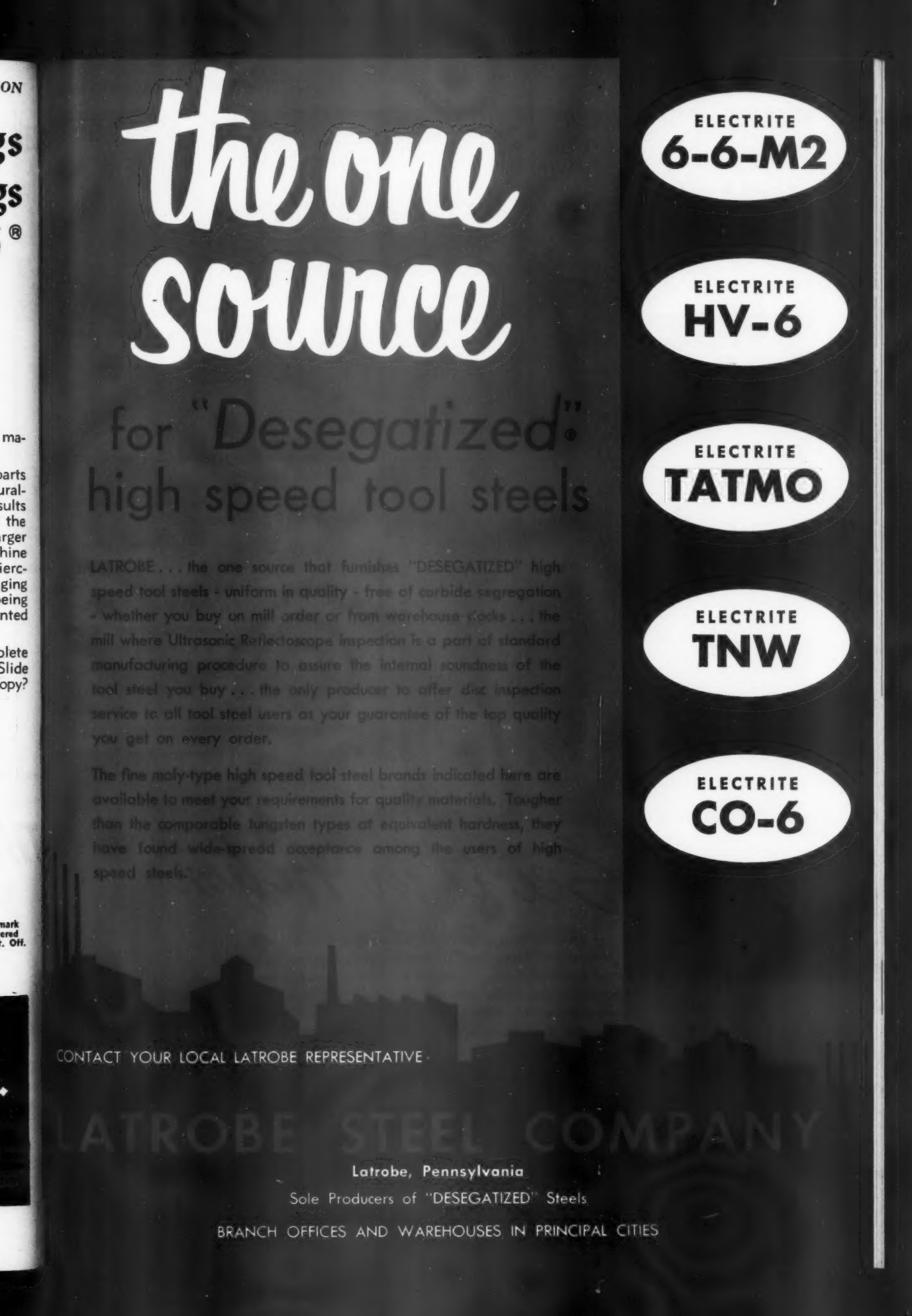
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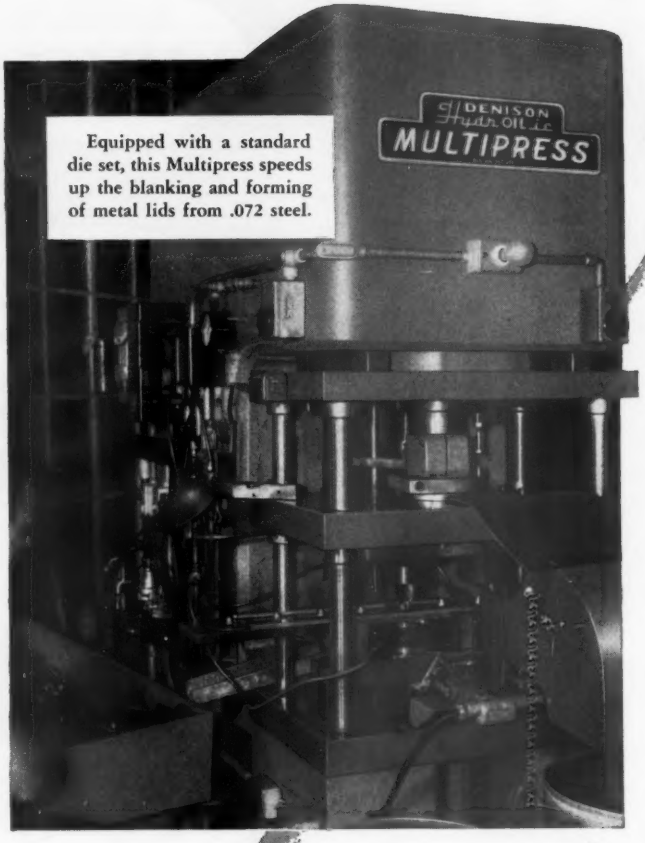

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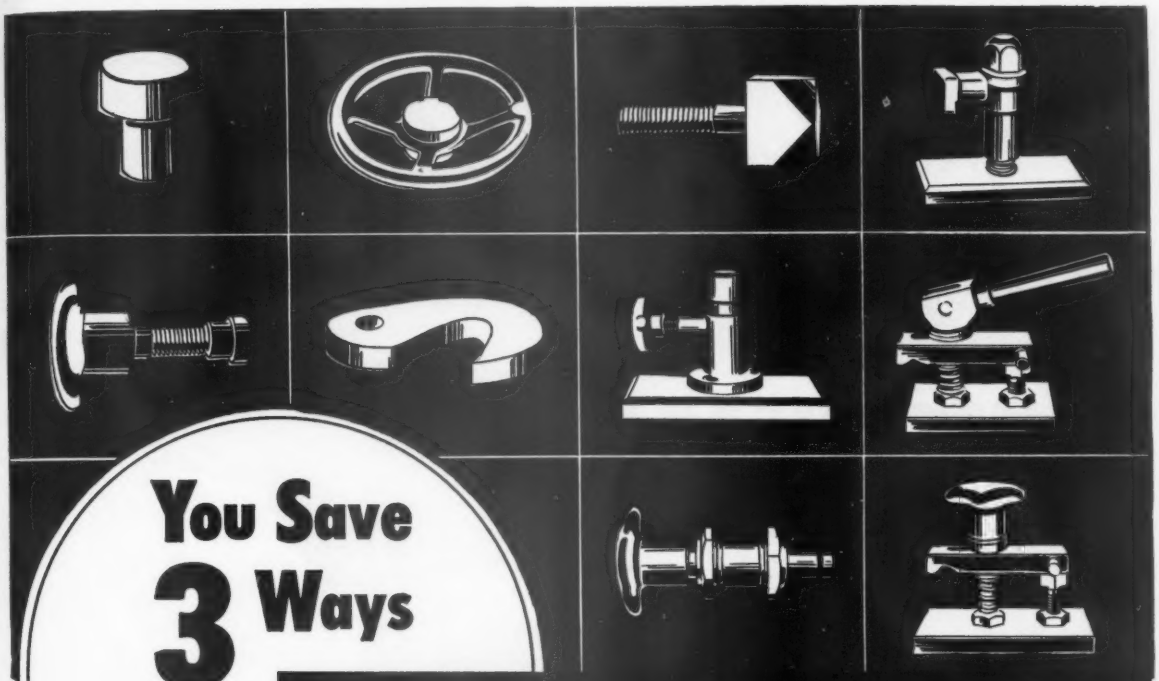

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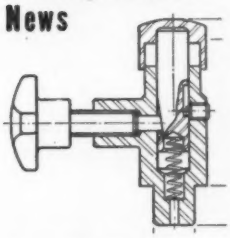

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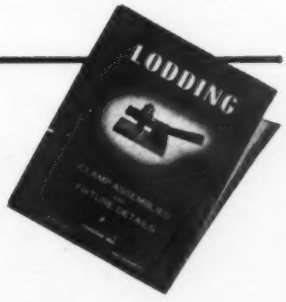

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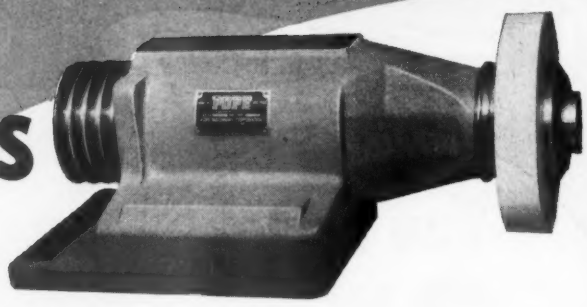
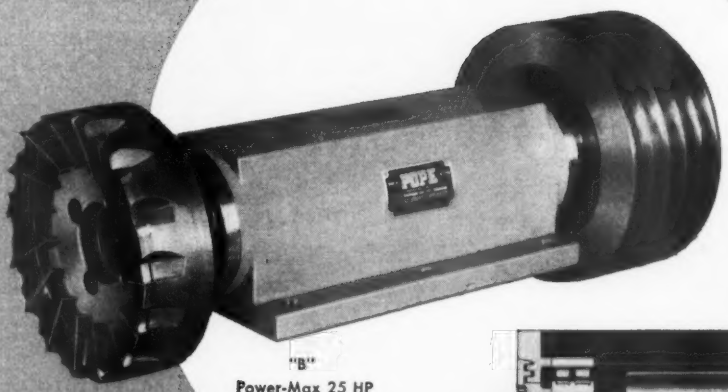


"A"



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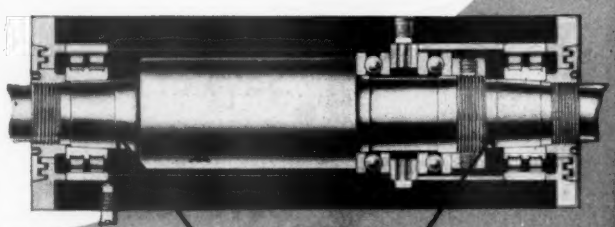

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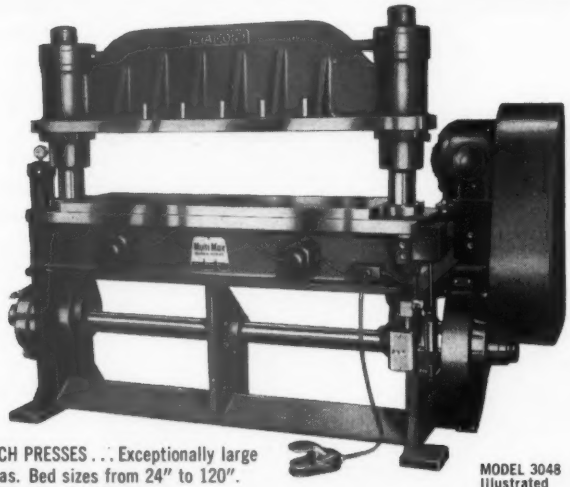

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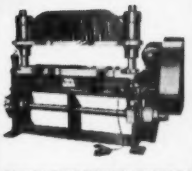

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SOON TO APPEAR IN FUTURE ISSUES

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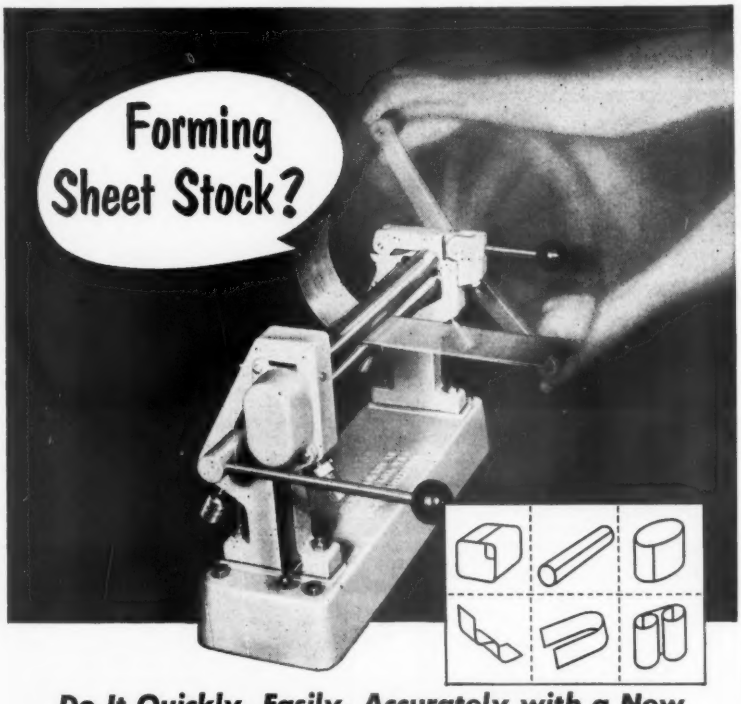

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"Progress on Parade" 157

Check this carefully. It can bring new efficiency to your operation. The newest in machines, tools, and accessories.

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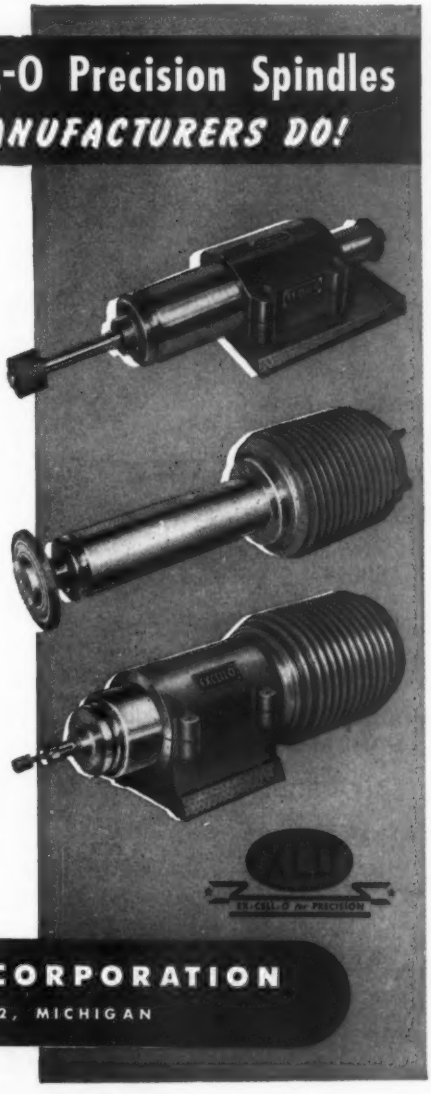

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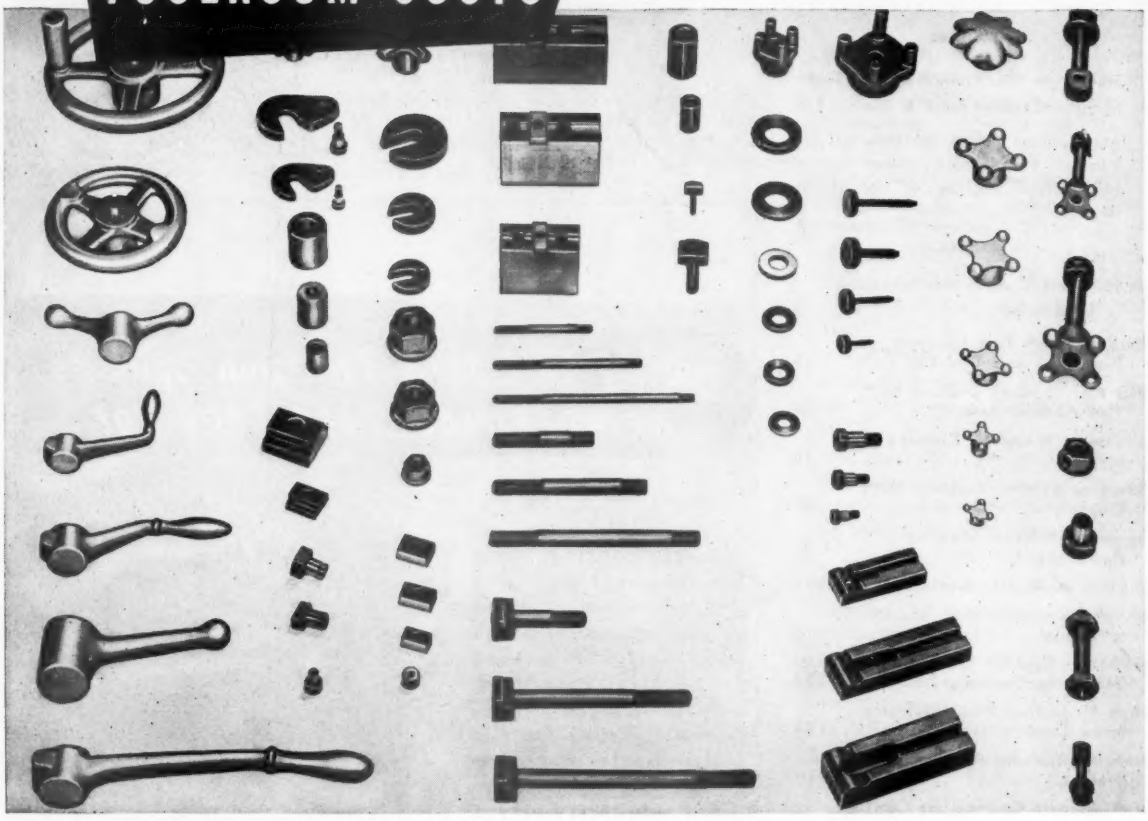

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editorial

cost reductions must be advertised and sold

To say that reduced costs are the key to today's profits is an understatement and an over-simplification of the greatest challenge facing our free enterprise economy.

The idea of being able to maintain profits through any reductions in the price of labor and materials presents a dim and distant picture. For both of these commodities the price trend is up rather than down. This elects the manufacturing functions of tooling and production as the sole remaining area in which enterprising management can "drill for oil."

Strange as it may seem, the burden of finding, acquiring, and putting into operation the tools, machines and methods capable of effecting cost reductions does not rest solely upon the manufacturer; even though he is the most interested party. Our competitive economy just doesn't tick in such a one-sided fashion.

Actually, the burden must be assumed also by those of you who have the tools, machines and methods to sell which will enable a manufacturer to "strike oil" in his efforts to reduce costs and maintain, or even increase, his profits.

In today's mail we received an announcement from Robert E. Lewis, president of Argus Cameras, Inc., where-in he said, "Sweeping improvements in production methods, combined with minor alterations in design, have made possible a $10 reduction in the retail price of the Argus C-4 Camera".

From Erhart C. Schlenker, Argus factory manager, we learned of the host of items that contributed to the production cost reduction and hence to the $10-lower selling price.

The list includes new processes, multiple drilling machines, equipment for automatic techniques, an automatic press, mechanical feed, stock straightener, automatic oiler, automatic scrap cutter, precision thread cutting machine, induction heating equipment, indexing fixtures, and related tooling, to mention but a few.

There is no doubt but that for a goodly number of you the Argus concern is a customer and/or prospect. Did you sell them any of their cost reduction?

Those of you who build and sell the tools, machines, and equipment capable of effecting cost reductions for your customers and prospects are, yourselves, in a highly competitive and vulnerable position. So, when progressive managements, like that of Argus, embark upon a program of cost reduction, who is going to get the business? Who is going to be looked to, to fill these needs?

The one among you who builds a better mousetrap and waits for the world to beat a path to his door? Or the one who builds a better mousetrap and tells the world about it. Tells the world by advertising and more advertising, by selling and harder selling.

In today's buyers' market the path to the better mousetrap builder's door is rough and rugged. It is road-blocked by his competitor's advertising which tells his prospect that there is a better route to modern and proved equipment. His prospect is met along the way by kindly people (his competitor's salesmen) who are able to detour the receptive prospect along their paths to higher productivity and lower costs.

Advertising does the job of surveying, grading and paving better paths; but advertising's paths run *from* a better mousetrap builder *to* his prospects. And his salesmen work these paths.

Without advertising's illuminated and well-marked paths, the other better mousetrap builder sits and waits, and wonders why his prospects don't show up.

E. Willard Pennington

editor

WRITE FOR BULLETIN No. 521

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SECOND OPERATIONS ON PARTS FROM AUTOMATIC DIES

In this article the author demonstrates how the piercing of these small holes by delicate punches is best accomplished as a second operation rather than to attempt to incorporate such punches in the cut and carry die that produces the workpiece initially. He shows saving in money, down-time, and grief.

THE SUCCESS OF HIGH AUTOMATIC DIE PRODUCTION hinges on uninterrupted operation. However, if a station is included that continually would threaten to cause trouble, it would be best to exclude this troublesome station and perform the operation in a smaller press. The overhead on large, expensive, automatic dieing presses is too great to permit a press to stand idle because of interrupted operation caused by an inherent weakness in one station.

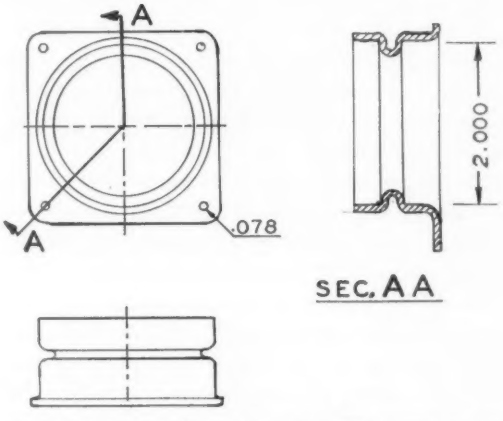
One of the most troublesome operations in cut and carry drawing dies is the piercing of holes smaller in diameter than the metal thickness.

This type of piercing calls for one of the most difficult tools to keep in continuous operation, i.e., a small delicate punch. Patented punches have done much to eliminate or alleviate this simple but extremely difficult operation but, like the proverbial dripping faucet, the problem is still with us.

The best result usually is found when the piercing can be undertaken as a secondary operation, hence not included in the blanking die. However, when this extra press operation is added, the additional expense must be justified by the tool's profitable performance.

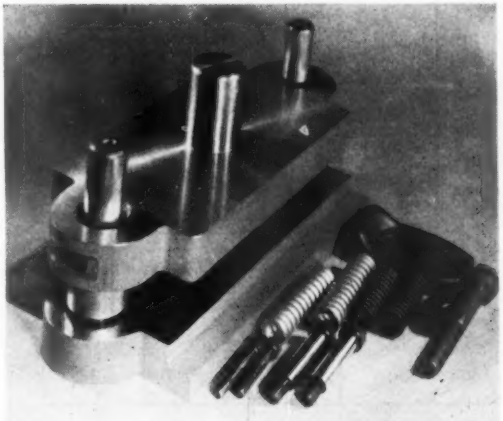
In some plants this type of die is built in tandem, having as many as six piercing stations. As a punch in one station breaks, the operation is moved over until all the stations have a broken punch at which time the die is removed from the press and the broken punches are replaced in all of the stations. Going to such extremes as this often does nothing to remedy a troublesome situation but only aggravates the problem.

Building such a die as described in this article is the author's best remedy for overcoming this general weakness. Concentration of effort can be made on the weaknesses that



are to be found in the one tool, and when once corrected most of the troubles are eliminated. The danger of breakage certainly would indicate that the design of the piercing die must be such as to simplify its maintenance and to reduce down time in operation.

Regardless of the type of die that is built, it must be admitted that some punch breakage will occur but this is usually dismissed as crystalization, fatigue or improper tempering. This empirical judgment, if left unchecked, will lead to complete failure and ultimate ruin



With the exception of the member for piloting the workpiece, every item in the die described is a standard, mass-produced, stock part such as these; readily available and quickly replaced, thus minimizing costly down-time.

by Ernest J. Urbas
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of the die.

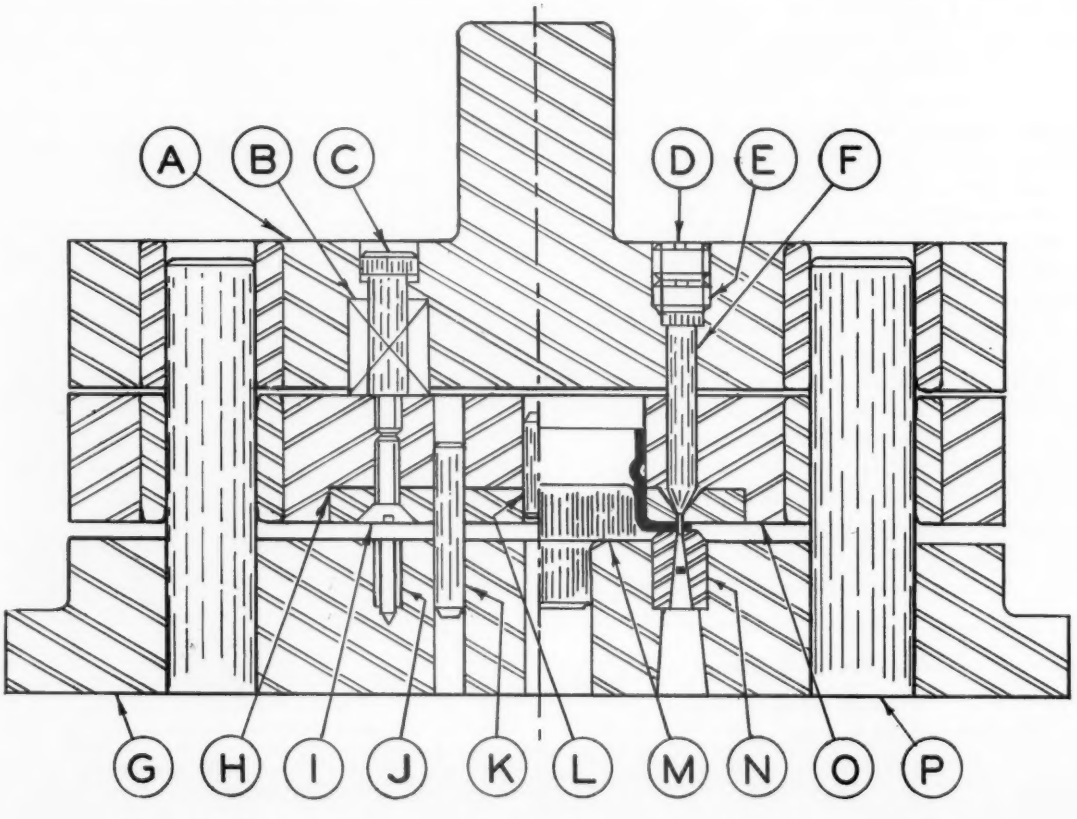
A much more scientific approach should be made to try to pinpoint the exact reason for each punch failure, i. e., a chart should be made and kept covering each and every punch. This should show type of steel, method of heat treating, Rockwell reading, finish (plain, chrome-plated, lateral-honed), pieces pierced before breaking, whether solid or sleeve type and actual position and location in the die, diameter of punch, diameter of bushing, magnified appearance of breakaway and magnified appearance of broken punch in relation to its position. When kept intelligently, this record can divulge inherent weaknesses of design and errors in building and maintaining the die and its components.

The principal reason for failure of punches in this type of piercing die is that the guiding of the punch point is not precise or strong enough to positively insure against any deflection as the punch perforates the metal. To overcome this punch guiding failure, it is obvious that to secure the best support for the stripper, which in turn is the guide for the points of the punches, the guide posts (P) of the die set offer the greatest precision and strength; and what better medium for a stripper (O) than a punch holder with the shank removed?

It should be noted that every item in this die except the pilot (M) is a prefabricated part which is mass produced, by specialists, and in standard sizes to exacting tolerances.

This is a typical example of the simplicity attainable in building a die by the purchase of standardized stock parts. Reducing the die-making time to a minimum, these parts are drilled, bored and assembled to produce an intricate die within a matter of hours. And most important, the maintenance time on this die is greatly reduced because of the feature of immediate parts replacement from standard stocks.

The punches (F) used in this die are of the one piece shoulder style. These punches are expendable, for little, if any, sharpening allowance is made. This is sacrificed in order to gain strength at the point diameter by keeping the point as short as possible. The punch pad that is usually used to retain the punches is omitted and the punches are inserted directly in the punch holder (A). The fit between the punch shank and the hole into which it goes, must be a slip fit; if any-



thing, the fit should be .001 loose rather than tight. To check the fit, you should be able to rotate the punch with your fingers. The reason for this is to allow the punch to have a small amount of floating action to compensate for any warpage or runout which might occur during the cylindrical grinding of the punch.

The punches (F) are retained in the punchholder by set screws (D, E) directly behind the head of the punch. This method permits quick and easy replacement of broken punches. It is important to remember to not tighten the set screw (E) that engages the punch head too much, for you might lose the floating action that is so necessary for successful operation. This set screw is locked in turn by a second set screw (D) directly behind the first which prevents the first set screw from backing away from the punch head.

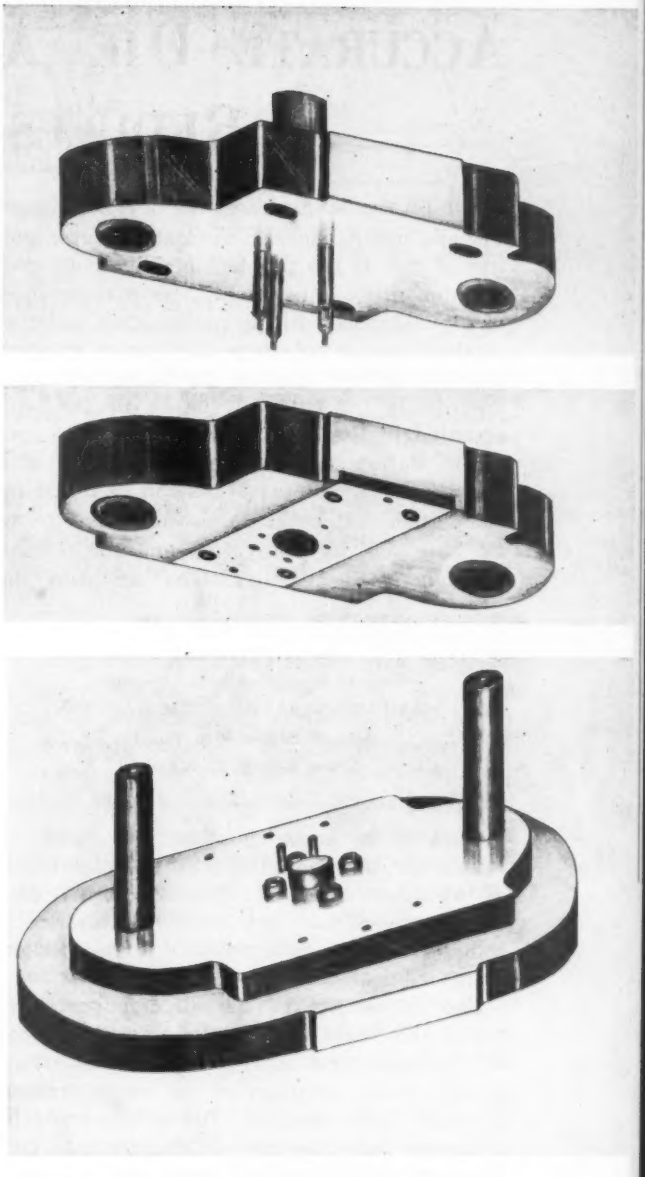
The stripper (O) is spring-loaded with heavy duty springs (B) which insure smooth positive stripping and, in addition, guarantee the pressing of the workpiece against the face of the piercing bushings (N) before the punches make contact.

The terrific pinching of the material around the punch point causes much of the trouble associated with small hole piercing. This can be evidenced when using sleeve type punches with peened heads, for these heads are literally torn out of their sockets. Lateral honing of the punch points and flash chrome plating of the points alleviate this condition by providing a slippery surface free of circumferential tool marks into which the material might press.

In the stripper face a trough is milled into which is recessed a hardened plate (H) of flat ground stock plate containing the four guide holes that guide the points. These holes must be lapped to slip over the punches. The stripper is raised by four stripper bolts (C) that pass through the springs. The guide posts are long enough so that on the up stroke the stripper does not leave the posts.

To insure the success of this type of piercing die the following procedures should be followed:

The first step in the construction of this die is to mill out a trough in the approximate center of the extra punch holder (O) (hereafter referred to as the stripper) to accommodate the flat ground stock plate (H) (hereafter referred to as the stripper plate) which was cut to the length of the trough. The stripper



Editor's Note: These delightful illustrations of the second operation die were drawn by Anne Urbas, the author's wife. Her ability to depict the correctness of form and relative location of the many components is most enviable We feel very fortunate in being able to present the work of a husband and wife contributing team to T and P readers. It is so unique in our field of publications that we are inclined to boast. The press tooling and die designing Know-How of author Ernest (Mr. Cut and Carry) Urbas, although nationally recognized and deservedly so, is wonderfully enhanced by artist Anne's participation. The first work she favored us with appeared in T and P, February 1953, pages 68 and 69. Better take another look.—E. W. P.

plate (H) is then secured to the stripper by four flat head screws (I). At this stage the stripper is slipped over the guide posts of the die shoe and the two dowel holes (L) are

. . . *Continued on page 182*

ACCURATE DIE ALIGNMENT REDUCES DIE MAINTENANCE

ONE OF THE MAJOR PROBLEMS of both design and maintenance in the manufacturer and use of dies is the problem of alignment and maintenance of alignment, also maintenance of die clearances during construction and the production life of dies. This is a greater problem in the smaller die category, more specifically the cutting type of dies as represented in the progressive or multiple and single station dies.

The term "sub-press", as can be found in some older text books, is also used as a term for "die set" by many tool and die people throughout the country. The sub-press or

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die set as we know it today is intended to insure the constant and accurate alignment of the upper and lower members of the die. The degree of accuracy to which this is accomplished is directly relative to the design or mechanical principle used.

The importance of the alignment of the upper and lower members of the die can be better understood if consideration is given to the average accuracy of the punch presses in which they are used. The average punch press has numerous deficiencies such as gib clearances due to normal wear, out of parallel conditions of the ram and the bed due to normal die changes and caused by handling and repeated set-ups on basically soft materials, such as steel and cast iron. These errors, magnified by the tonnage required to operate the die, reflect themselves in conflicting forces and thrusts within the die itself.

These forces and thrusts always seek the path of least resistance, thereby a die with insufficient stability within itself to overcome these forces will shear itself, ship its cutting edges, break punches, produce irregular break lines, and cause large and irregular burrs on the parts produced.

After giving this problem serious consideration throughout the years, our experience has proved that a very simple application of good mechanical design will solve the problem.

The accompanying sketches, Figures 1, 2 and 3, are almost self-explanatory. As can be seen, the problem develops because of a triangulation factor. There are other factors also which do contribute to the problem, such as pin deflection, bushing and pin fit, and bushing and pin contact areas.

Figure 1 represents the design principle applied by the majority of those in the die industry; it also shows the triangulation developed between the points **a**, **b** and **c** relative to the cutting plane. It is a very simple thing for anyone to determine the potential error of alignment at the cutting edge, point **a**, when fixed values for this triangle are applied to the die in question.

It has been the experience of the writer that where this condition has been at its worst, die makers during construction would complain of not being able to maintain die clearances when setting up the sections. And, as can be seen, where close die clearances are involved, the tolerance of fit between bushing and pin would cause the steels to shear in or ride up, depending on the out-of-parallelism allowed by the mis-alignment.

Figure 2 illustrates this. This can also be demonstrated very effectively in your shop by setting up a punch and a die with the necessary clearance and then with a jack placed under the forward part of the die, gently tap the rear or guide pin area down. Then, with a light in the background look through the underside of the die. What you see is exactly what prevails during the die operation; when coupled with the press the condition worsens because of the thrusts and tonnages involved.

The solution to this problem is very apparent and is summed up in Figure 3. What has b e e n accomplished in the design of Figure 3 is this:

1. An integral part of the upper shoe has been brought down to, or below, the cutting plane.

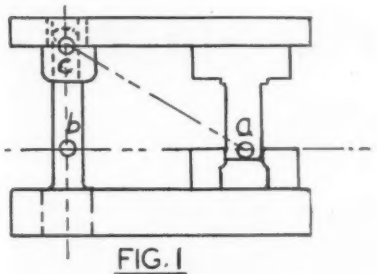


FIG. 1

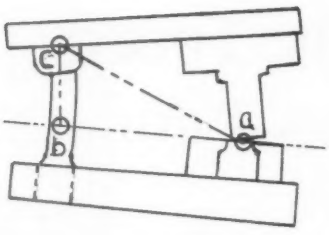


FIG. 2

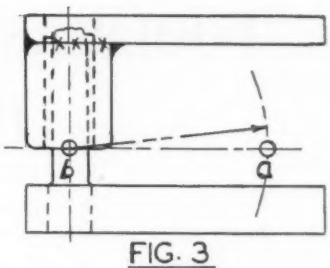


FIG. 3

The standard die design practice as found in use by the majority of small die builders and users is demonstrated in Figure 1. It shows the triangulation developed between points a, b, and c, relative to the cutting plane. Figure 2 is an exaggerated illustration of what can happen when the design shown in Figure 1 is used. Point c becomes the pivot point and any misalignment caused by normal press variation of forces and thrusts within the die is reflected in misalignment of the cutting or working edges of the die. The angles of misalignment are proportionate and directly relate to the proper functioning of the cutting edge of the die. Correction of the misalignment due to instability and triangulation is represented in Figure 3. The pivot point is brought down to, or below, the cutting plane. This reduces the errors of alignment caused by press irregularities, irregular forces, and thrusts within the die itself.

2. The triangulation has been reduced to a minimum. The unsupported pin length has been cut down, reducing substantially any pin deflection during operation.

3. Straight bushings of greater contact area can be used, giving a consistency and stability not gained by the use of shorter shoulder bushings.

4. In many cases where dies are used in presses with short strokes, the pins can be confined within the bushing, thus gaining a major factor of safety as an additional premium, and,

5. A natural reservoir for lubricant is available on the top of the bushing in such cases.

It will only be necessary for one to make very simple experiments in die construction and production to recognize the value of this method of correction. We, at Nash-Kelvinator, have incorporated this construction 100% on all dies where critical alignment becomes a factor for consideration. Our maintenance costs have definitely been reduced as a result.

In adopting this design, several die set manufacturers cooperated to give us these die set for our requirements. In fact, one die set manufacturer revised his catalog to incorporate this feature. The additional cost involved is very nominal and insignificant when compared with the advantages gained.

It is the writer's hope and desire that through this conveyance of our experiences to other people with like problems they may find a solution to a few of those "repeaters" which keep knocking at the tool room door for sharpening and maintenance. It can also be seen from the above illustrations that the construction of progressive dies is facilitated when truly accurate methods of alignment are used.

Safety in the Tool and Die Shop

While there are no statistics on accident experience in the tool and die industry, the figures for the machinery and automobile industries should give an idea of the situation.

The records of the major automobile companies show a frequency rate of 4.3 disabling injuries per million man hours worked. But the average for companies employing less than 500 is 12.3, almost three times as great. And for the shops with less than 100 employees, the frequency rate no doubt is still higher. The record of the machinery industry is about average, that is 9.3. The frequency rate for tool and die shops may well be about 20 because of the small size of the companies.

The average small shop can cut accidents by following these seven steps: (1.) Have the man at the top recognize he has an accident problem and insist on stopping accidents. (2.) Assign the job of handling safety work to some alert and responsible employee. (3.) Locate the hazards. (4.) Then eliminate the hazards. (5.) Train the employees to work safely. (6.) Keep simple records. (7.) Follow up and maintain the interest of supervisors and employees.

A safety program can be effective only through genuine interest and follow-through on the part of top management.

From an address by A. M. Baltzer, Director Small Business and Associations Program, National Safety Council, Business Session of the 1952 NTDMA Convention held in Chicago.

TOOLPLASTIK TOOLING FOR SHORT RUN PRODUCTION

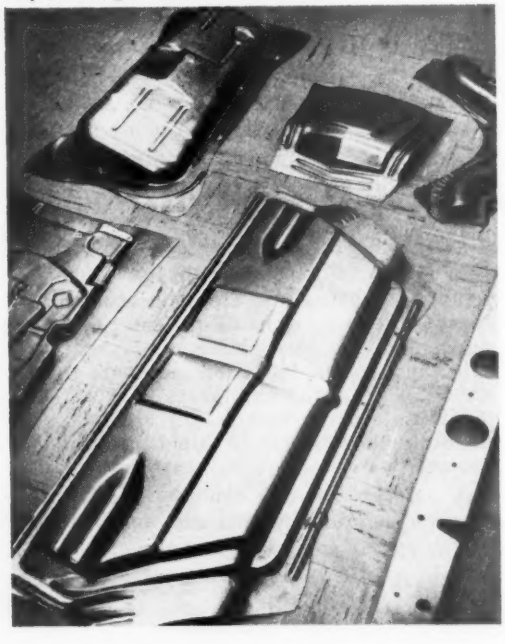
All about us we see evidence of the great forward strides made in the development of new products and new materials from which products can be made.

New materials do not mean that previously used substances are automatically rendered obsolete. Both the new and the old have their limitations. It is for industry to determine when to use the old and when to use the new to the best advantage. Moreover, these materials that are new must be used properly. In order that this can be accomplished the technique of working with the new material must be learned. This general picture has a specific bearing on Rezolin Inc., and Toolplastik.

by James D. Callahan
REZOLIN, INC.
Los Angeles, Calif.

For fifteen years Rezolin has pioneered with Toolplastik. Rezolin does not contend that Toolplastik applications can be used in every and all phases of industrial tooling. But it has been proved, and is a matter of record, that there are many tooling applications where Toolplastik, properly used, is a better material for the purpose than those previously used. Not only is it better technically, but it offers savings in time and cost of the finished tool. It definitely does not require the use of "hard to find" skilled craftsmen.

Finished auto parts from Toolplastik draw dies. Note variety of configurations built in the dies.

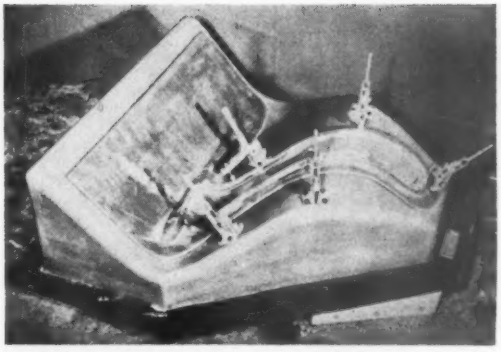


Aircraft part being removed from Toolplastik draw die.

Rezolin non-shrink Toolplastik is a thermosetting liquid phenolic plastic material developed for exceptional dimensional stability and ease of handling. Hardened in the presence of heat, it becomes insoluble and cannot be resoftened. Toolplastik is mixed cold and readily poured without pressure into simple molds. Curing is usually accomplished in a low temperature oven. It undergoes a negligible dimensional change during the transition from a liquid to a solid. Its thermal expansion is virtually the same as mild steel and not too different from that of cast iron. This enables the use of these materials in combination with one another, thereby providing the additional strength and resistance to erosion needed to make plastic tools.

The main tooling advantages of Rezolin Toolplastik stem from its non-shrink quality. The tools are cast "net" without shrink patterns. If the molds are properly prepared the tool can be put into production with the "as cast" finish. This is not true of the conventional cast metals which undergo severe shrinkage as they solidify and require hours of blue blocking and die barbering to bring the die within tolerance.

Some of the other advantages derived from



Rezolin nest block for trim and drill fixture insures consistent location of aluminum workpiece.

Toolplastik's ability to be combined with steel and iron are: the use of rugged low cost steel weldments and wear inserts of hardened steel, plus the fact that complicated contours can be cast cheaply, and faithfully reproduced with Toolplastik. The characteristics in the finished work are the same as are obtained with steel dies.

Die designs can be proved before permanent tooling is started. Dies can be quickly duplicated to save down-time while a broken die is being repaired or rebuilt. Extended-run dies can be constructed by combining steel with Toolplastik. Freedom and versatility of tool design achieve maximum efficiency because each application may be reviewed in the light of its own requirement.

An important fact to keep in mind is that the use of this material in the construction of models, jigs, nesting fixtures, duplicating patterns, stretch dies, draw dies, etc., in no way competes with the use of steel in production tooling as prescribed by general practice. Toolplastik is not a competitor in any sense, rather it is a new medium possessing many advantages that can be well applied in any tooling program.

Physical Properties of Rezolin Toolplastik

Shrinkage from mold dimensions (inches/in)	Negligible
Rockwell hardness "R" scale ½" ball	110
Flexural strength P.S.I.	800
Modulus of elasticity in flexure	.5 to .7 x 10^6
Compression strength P.S.I.	11000
Tensile strength P.S.I.	5000
Impact strength—ft. lbs. per inch of notch—Izod	.24 — .3
Water absorption	0.4%
Linear coefficient of thermal expansion inch/inch/°F change	.0000062
Specific gravity	1.26
Weight per cu. in.	.0455 lbs.
Arc resistance	none
Dielectric strength s/s	130 V/M/
Dielectric constant	17.42

Should be stored in cool place.

At 70 degrees F. Resin Viscosity Standards will be maintained for 3 months.

At 30 to 35 degrees F. Viscosity Standards will be maintained 9 months.

IMPORTANT—Allow Resin to return to room temperature before mixing.

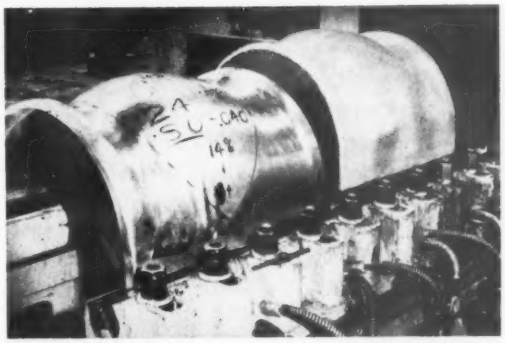
By taking just one type of tool which can be made from Toolplastik its specific advantages can be best illustrated.

In the construction of a Toolplastik draw die the cavity is cast directly against the punch and binder ring in closed die position, with the thickness of the material to be formed simulated by pattern makers wax or multiple coats of lacquer primer surfacer. This method automatically insures a perfect fit between all working surfaces of the die without the usual days of die barbering and proving. Rezolin draw dies are being made in 50% less man hours than required for making comparable metal dies.

A typical draw die has been constructed and proved in three weeks or less. Each member of the die can be cast and ready for use in hours. As one half is cast against its mate for a perfect fit, a Rezolin die may be ready for production within weeks instead of months. Toolplastik draw dies are spotted in within a matter of hours.

In its fifteen years of pioneering, Rezolin, Inc., has carefully compiled records from well known major manufacturing organizations

. . . *Continued on page 184*



At the left in the above view is a typical aircraft part that has been produced on the Rezolin Toolplastik stretch die which is seen at the right.

This Toolplastik draw die, mounted on a heavy steel plate, and constructed from a plaster model, is used in aircraft parts manufacture.

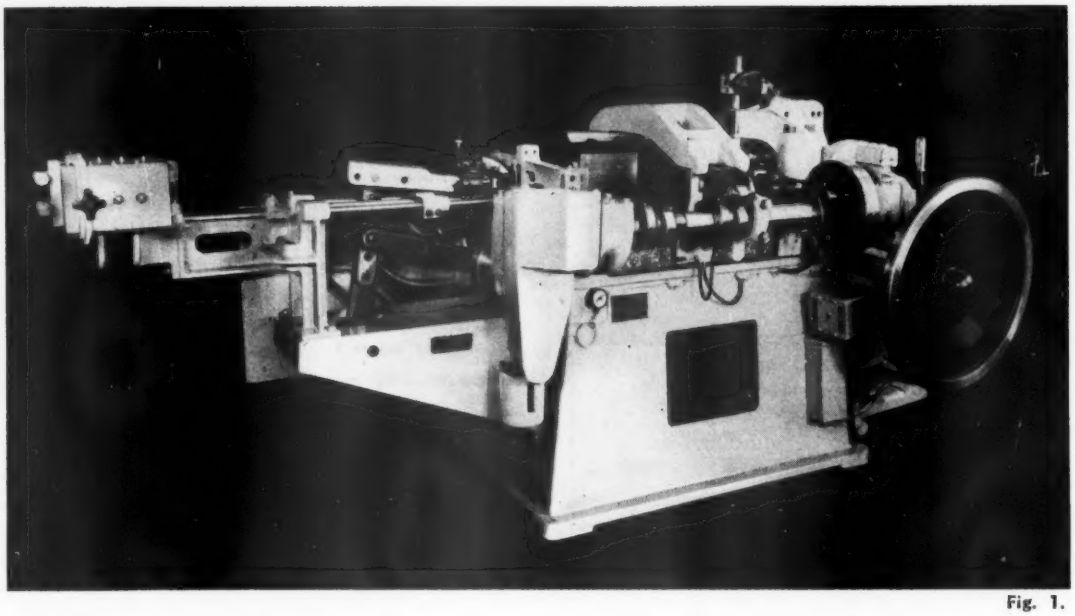


Fig. 1.

MULTI-SLIDES® AND THEIR TOOLING

THE EVER INCREASING use of metal stampings, both as end products and as components of complicated assemblies, has resulted in greater attention not only to die design and contruction but also to the type of machine in which metal stampings can be produced.

Generally speaking, stampings are produced in (1) conventional punch presses, (2) dieing machines, (3) four-slide machines, and variations of each of these. Each type has its own inherent advantages and limitations.

The Multi-Slide (Fig. 1) is one particular make of machine that employs one or more "rams" for conventional press-die operations, plus a four-slide forming arrangement for supplementary operations. These additional operations usually are of such nature that they would not ordinarily be done in the first die setup on a conventional press. Principal components of the machine are shown in the schematic top view (Fig. 2). Cams mounted upon a continuous shaft system around the four sides of the machine bed actuate the various rams and slides.

Work material is normally fed into the machine in a vertical position (on edge), as compared to conventional presses where the material is usually fed horizontally (laying flat). Because of the normal on-edge position of the material, most of the tooling members operate in the horizontal plane. An important exception to this is the final-form stripper which operates vertically.

The machine is so designed that, depending on machine size, from one to four rams can be mounted and used simultaneously. On each ram is mounted a die assembly comparable to that used in a conventional punch press. Available, in addition to the four standard forming slides, is a variety of other slides such as a rear auxiliary slide (Fig. 3) that is employed to provide a counter-pressure to that exerted by the rams.

Rams on late models in the larger sizes can be actuated from either front or rear of the machine. This is an advantage when burrs must be limited to a particular side of the finished piece, relative to direction of forming.

Where part fabrication requires a combination of operations, such as swaging and trimming located close together, the fact that the ram can be used from either direction often permits a better die design with decreased tool maintenance. In certain instances, two rams can be used in directly opposed position. This means that both the punch and the die move in and out from the stock line, permiting free movement of material that has undergone a drawing or pre-forming operation.

® Reg. Trade Mark. U. S. Tool Company, Inc.

For heavy duty swaging, embossing, coining, or countersinking of previously pierced holes, a horizontal lever or toggle press—capable of exerting up to 100 tons—can be mounted on the machine bed in place of a ram.

Machine Operation

In operation, the stock coil is mounted on a horizontal reel, which is positioned at the left hand or entrance end of the machine (Fig. 2). This reel, actuated intermittently by a mercury switch control, maintains a loose loop of material between the reel and the feeding mechanism of the machine.

The strip is fed into the machine from left to right, by means of an eccentric-operated slide feed mechanism. The material is drawn through a stock straightener for removal of coil set. The feed block reciprocates on hardened and ground slide rods between adjustable positive stops, and thus is confined to an exact advance, ensuring controlled accuracy of feed or pitch length to ± .001". Between the feed mechanism and the ram is a cam-actuated stock check, which prevents any motion of the material after it has advanced to the proper pitch length.

In the ram, the die members are fastened to a die shoe and the punch members to a punch holder. The die shoe and the punch holder comprise a die set of slightly different design than those used with conventional punch presses. The die shoe is bolted to a vertical plate or bolster at the rear of the machine bed, while the punch holder is secured to the cam-actuated ram slide, which normally operates from the front of the machine (Fig. 4).

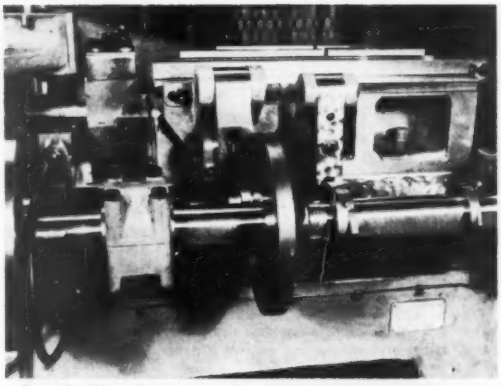
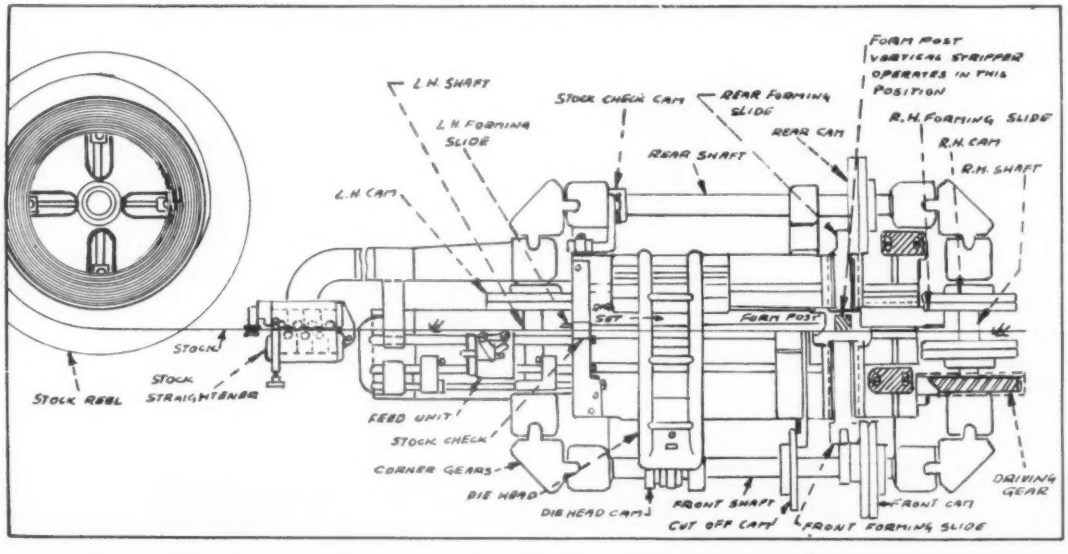


Fig. 3. View from rear of machine, showing the rear auxiliary slide operated by the large cam at the center of the shart, and the rear positive knockout operated by the smaller cam directly to the right of the large cam.

After the die operations are performed, the blank is separated from the strip either in the die or by separate cam-actuated cut-off slide, mounted between the final ram position and the forming slides. When separated from the strip at this point, the blank is picked up by the forming tools immediately after cut-off.

The standard forming unit consists of left hand, right hand, front and rear slides. Each of these is actuated by individual split-type cams mounted on cam carriers which, in turn, are fastened to the horizontal machine shafts. This facilitates setup and adjustment, since the shaft system does not have to be disturbed.

Fig. 2. Schematic drawing of No. 33 Multi-Slide, looking down at top of machine.



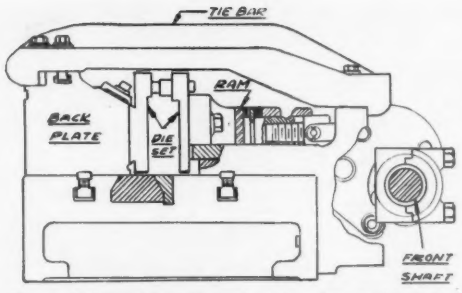


Fig. 4. Schematic cross-section drawing, looking from the left side of the press, showing method of ram operation and mounting of the die set.

In some instances, the cam carriers are graduated through 360° to further facilitate setup and changeover, so far as timing the cams is concerned (Fig. 5).

The form post, when required, is mounted in a holder provided in the stripper mechanism. The vertical stripper movement is then employed to strip the finished part from the post and eject it from the machine. In certain instances, it is necessary to form a part on more than one level and the vertical movement can be employed to progressively lower the part on the vertical post to each forming level and then finally strip the finished part from the post. At other times, it may be possible to use the vertical motion of the stripper mechanism to perform a downward forming operation.

An electrically-operated brake is controlled by two micro-switches. As the end of the material strip enters the forming position, it contacts an arm on one micro-switch, which is located under the stripper head. At the same instant, a cam on the rear shaft actuates

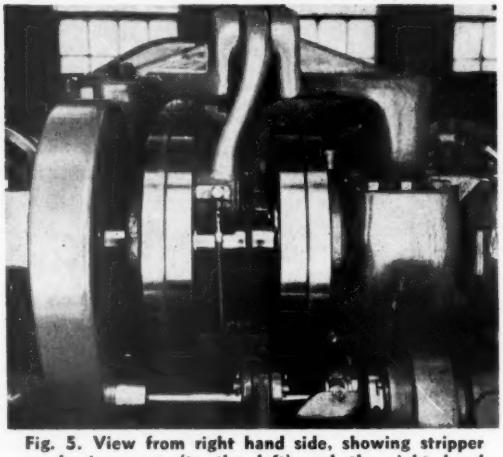
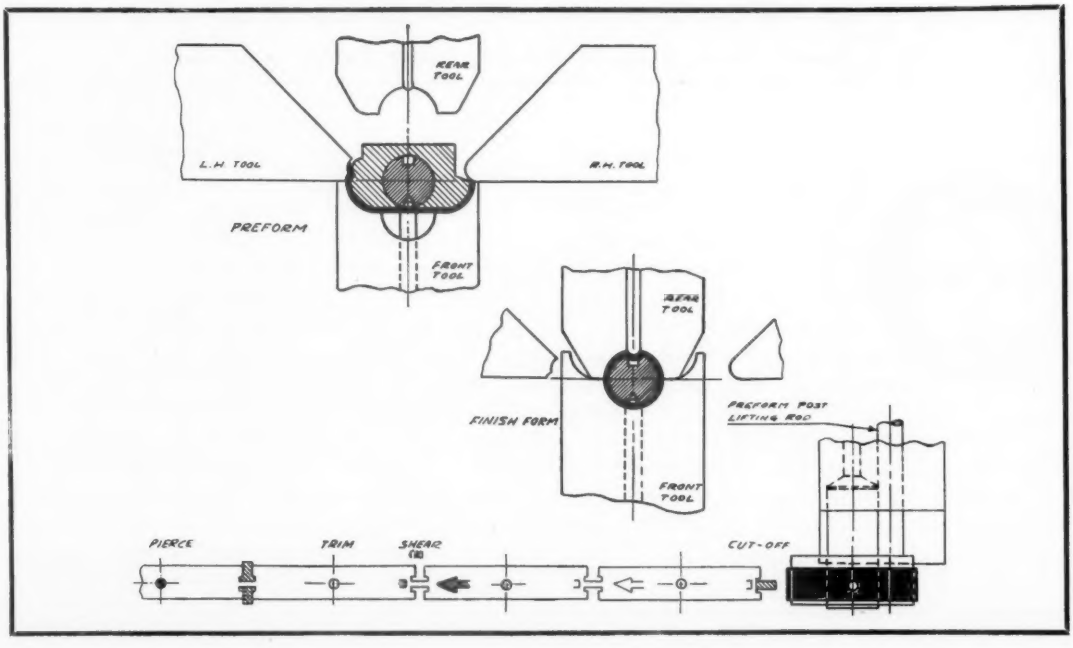


Fig. 5. View from right hand side, showing stripper mechanism cam (to the left) and the right hand forming slide cam (to the right) mounted on graduated cam carriers.

a second micro-switch, which is synchronized with the one under the stripper head. If the end of the material strip fails to contact the micro-switch located under the stripper head, the clutch will be automatically disengaged, and the brake applied. The machine is thus stopped instantly, preventing damage to tools and machine.

. . . *Continued on page 138*

Fig. 6. Operations sequence for typewriter ribbon spool core.



"Die Designing and Estimating"

Application and Design of Blanking Dies

Taken from the 4th Edition of* "DIE DESIGNING AND ESTIMATING"

Most raw material for stamping comes to the press shop in the form of flat mill stock—sheet or strip. The conversion of this mill stock into flat **blanks** of size and outline identical to or approximating that of the "flattened" finished part, constitutes an essential step in the fabrication of the final product. (The development of blanks for formed and drawn shapes is discussed elsewhere in this book.)

Blanking, the production of the blank, is generally referred to as "first-operation" work, and production of any further details on the blank as "secondary operations". In many instances blanking is actually the first press operation and is done in a single-purpose blanking die; the blank is then passed through various other dies for the addition of design details. One or more or all of these secondary operations often can be incorporated along with the blanking operation in the first die used; such a die may be of the combination, compound, or progressive type. In such dies, any or all of these secondary operations may precede the blanking operation.

This chapter, however, is concerned primarily with single-purpose blanking dies and, in a general sense, with the blanking function of a multi-operation die where the same basic design considerations are applicable.

Quite frequently it is impractical to blank directly from continuous strip or from a strip length, which in either case is advanced at each stroke of the ram. (Fig. 3-1). If such is the case, the die is designed to take **unit stock**—fed to the press one piece per stroke of the ram (Fig. 3-2). One piece of unit stock usually produces just one blank, although a combination die could produce two or even more blanks from a single piece of unit stock. (See chapter on Combination and Compound Dies).

For large stampings in particular, unit stock may be a standard mill size sheet. In most instances, however, unit stock is cut close to but somewhat larger than blank dimensions from scrap, mill ends, or sheet, by use of squaring shears. Or, it may be produced from continuous strip by means of a cut-off die, although the latter type of die is usually used as a substitute for the blanking die.

Basic Design Factors

Assuming that the blanking pressures, the blank size, and stock strip layout have been determined as discussed earlier, careful study should be given to the blank, the stock from which it will be produced, and the operating conditions involved.

The blanking pressures and the blank size help in selecting a press with sufficient capacity for the job. The press in turn provides die mounting details, size limitations, length of stroke, shut height . . . all needed in die design.

The size, weight, and strength of the blank are factors in determining whether the blank can drop through the die or should be returned into the scrap strip. The strip layout indicates direction of feed, method of guiding the stock, positioning of the stock stop, and relation of blank details to centerlines on press tools.

* The popular Dannes & Bohmer textbook, "Die Designing and Estimating", is in the final stages of being thoroughly revised and enlarged. Copies of this book will be available for purchase at an early date. The material preprinted here represents an extensive revision and expansion of the original text on the same subject. — W.N.N., Tech. Ed.

Example Of Strip Stock

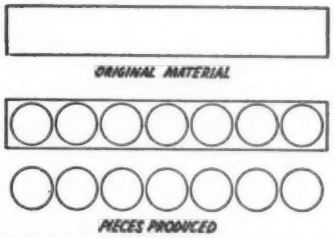


Fig. 3-1. Strip stock is fed into the press for a series of repetitive operations. A blank is produced at each stroke of the ram, leaving a scrap strip (web or skeleton).

Example Of Unit Stock

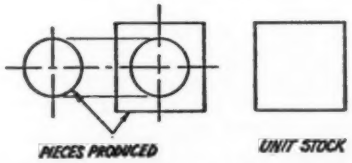


Fig. 3-2. Unit stock is fed into the press, one at a time, for each stroke of the ram. Usually one blank is produced from each piece of stock, the remaining metal being scrap.

Unit stock will require a different method of positioning than will strip stock, and the use of non-uniform scrap sheets will be still different.

Close tolerances on blank dimensions require close punch-and-die clearances and two or more guide-posts for aligning the press tools. Close tolerances also affect the type of guide-post used and the general construction of the die.

The size and rigidity of the stock helps determine method of feeding it and the area required for loading and unloading. The number and position of the guide-posts may be limited somewhat by large or irregular shaped stock.

On a blanking die, the burr is always on that surface of the blank facing the punch. In some operations the burr must appear on a certain side of the blank in relation to certain details of the blank contours. This requires detailing the punch and die block accordingly and prevents using the same punch and die for both right and left hand blanks.

Types of Blanking Dies

There are two general types of blanking dies—the **drop through** (Fig. 3-3) and the **inverted** (Fig. 3-4). In the former type, the die block assembly is mounted on the press bed or bolster plate and the punch assembly on the press ram. In the inverted type, the punch becomes the lower stationary member, while the die block is mounted on the ram. Either type may be used with unit stock or strip stock.

The drop-through die is a highly-simplified die, which is economical to build and maintain and is fast in operation. In this type of die, the blank drops of its own weight through the opening provided in the die half of the assembly.

The inverted-type die is somewhat more complicated, more costly, and generally slower in operation. A device is necessary to knock the blank out of the die opening. The scrap is usually easier to dispose of, but the blank is more troublesome to remove from the working area. Despite its disadvantages, this type of die is widely used where blanks of uniform flatness are required, or where the blank is too large or heavy to permit drop-through construction. Furthermore, if piercing is combined with the blanking operation, all burrs will appear on the same surface; this, of course, is highly desirable.

Three examples of where drop-through construction would be impractical are (1) where the blank is larger than the press-bed opening, and too large to permit elevating the die and ejecting the blank from beneath it, (2) where the blank is too heavy to be dropped for any appreciable distance, or too awkward to remove from below the press, and (3) where the blank is too fragile to be dropped very far.

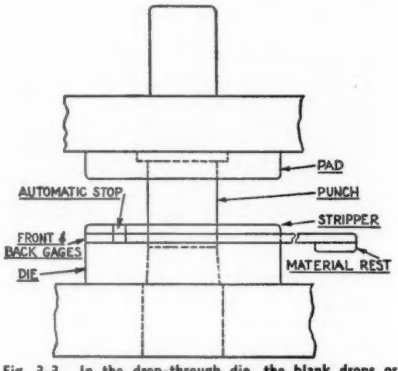


Fig. 3-3. In the drop-through die, the blank drops or is forced through the die and is unloaded from the bottom of die or press.

Although the term **return-blank** is sometimes used synonymously for **inverted**, it is more commonly used in reference to a die designed to purposely return the blank **into** the stock strip from whence it came, the blank being removed from the operating area by advance of the stock strip. The blank is then shaken or knocked out of the strip.

The cutting tools in a return-blank die usually are inverted, although a spring shedder can be provided in the die opening of the lower tool to force the blank back up into the stock strip.

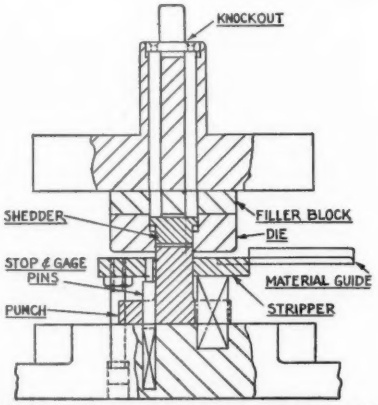


Fig. 3-4. In the inverted die, the cutting members are transposed and some device is used to knock the blank down and out of the die block.

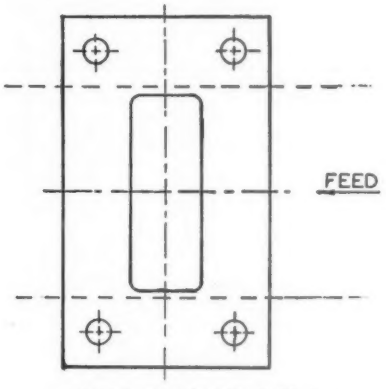


Fig. 3-5. Layout of the die block.

On occasion, the drop-through principle is applied to dies having inverted tools. The small relief in the overhead die opening tends to prevent the blank from dropping back onto the strip, and successive punchings force the blank on up and out through a chute.

This type of construction is used principally on dies for steeply inclined presses and for ductile materials which, in blank form, will expand enough to stick in the die opening and not fall back of their own weight.

Certain design features are essentially the same on the various types of blanking dies, and the following parts are common to all: Die block, punch, stock guides, stock stop, stripper, die shoe, punch holder, and guide posts.

Die Block

The die block (Fig. 3-5) constitutes the female half of the two mated tools

The DoAll Company

Fig. 3-7. Punch and die made in one cut, by contour sawing method.

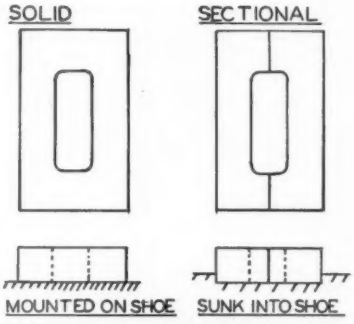


Fig. 3-6. Solid and sectional construction of the die block, and usual methods of mounting. Note that the block at right is sectioned in a direction that will reduce machining.

which carry the cutting edges. A vertical opening extending through the block determines the size and outline of the blank.

The amount of radial or side clearance between punch and die necessary to obtain proper breakage of the stock, must be provided on the punch and not on the die block.

The block is made of a superior tool material because of the critical nature of its inside dimensions and the finish of surfaces in contact with the work, and because this portion of the die is subjected to extreme pressures and wear conditions. In order to keep manufacturing and maintenance costs to a minimum, the die block should be kept as small as possible without lowering its strength and service life below requirements.

The die block is held in or on a die shoe, sometimes with the aid and support of an intermediate die retainer.

In executing the top view of the die block, the blank outline is drawn to scale in proper relation to edges of stock and direction of feed (Fig. 3-5). Radial centerlines are drawn and the die block proportioned about the blank outline.

Sufficient wall thickness must be provided at the weakest point between the die opening and outer edge of the block. This will be affected by the tool material used, the method of hardening, the over-all size of die block or section, its thickness, the press tonnage required, and the complexity of the blank outline.

In general, this wall thickness can vary from one die-block thickness on small dies to two die-block thicknesses on large dies.

Where possible, the cross-sectional dimensions and shape of the die block should be adjusted to permit using standard commercially-available ground tool steel flats or blanks.

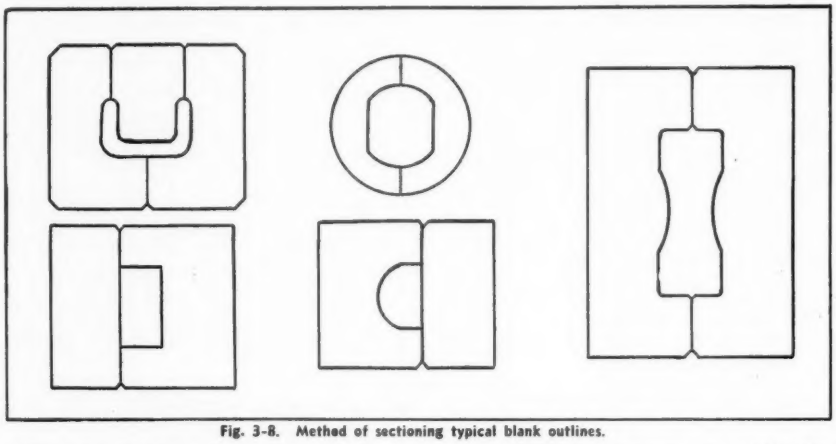


Fig. 3-8. Method of sectioning typical blank outlines.

The die block may be of solid or sectional construction (Fig. 3-6). This will depend largely on the contour and size of the opening required. A fairly small opening with a contour which will readily permit machining will call for a solid die block. Modern die room equipment has extended the range for solid construction by permitting, under certain conditions, punch and die to be made with one cut (Fig. 3-7).

Sectional die block construction is preferable in many instances, due to the simplicity in machining or working out the desired shape, and in maintenance of the die (Fig. 3-8). Dies with long or complicated contours can often be broken up into sections of simple geometrical form which will be easily and economically machined.

Building the die block in sections will reduce the dangers of distortion and fracture during the hardening process. Maintenance will be facilitated in those cases where there is a relatively weak point along the blanking contour that may demand early repair or replacement.

Sectional die construction is less desirable when the work material is of great thickness and there is considerable side stress or pressure in blanking. If there is any reason to believe that the sections will give or move, provisions must be made either to sink the die into the shoe (Fig. 3-6) or to insert large dowel pins where they will tend to keep the sections from turning.

The minimum thickness of the die block varies in accordance with the severity of the specific operation. To the calculated thickness required to resist fracture, should be added the average amount of stock removed per grind multiplied by the number of regrinds expected to be necessary.

The average amount of tool steel removed per grind can be assumed as 0.005" and of cemented carbide as 0.003".

Other factors such as properties of the particular grade of steel or carbide enter into this calculation; but, in general, the block thickness will range from ⅜" for a short-run die on small light parts to 1½" for high production on heavy parts (Fig. 3-9). Care must be taken not to make the block unnecessarily thick, since this would add to the cost of its manufacture and also may necessitate an excessive shut height.

Shear (inclining one cutting edge in relation to the other) is required more frequently on blanking than any other press operation. This method of providing for a progressive cutting action effectively reduces press exertion. The shear angle in a blanking die should be applied to the die block rather than

Relation of Die Block Thickness to Stock Thickness and Production Quantity

Stock Thickn.	QUANTITY						DIE BLOCK THICKNESS.
	5M	25M	50M	100M	500M	Unlim.	
.015	½	½	½	¾	1"	1¼	
.031	½	½	¾	1	1¼	1¼	
.093	½	¾	1	1¼	1¼	1¼	
.125	¾	1	1¼	1¼	1¼	1¼	
.187	1	1¼	1¼	1¼	1¼	1¼	
.250	1¼	1¼	1¼	1¼	1¼	1¼	

When the die is to be used for blanking parts made of lamination stock or other extremely hard or tough materials, increase the thicknesses given in the table by ⅛". For bakelite, brass or similar soft materials, reduce by ⅛".

Fig. 3-9.

the punch in order to ensure maximum flatness of the blank. Shear angles are discussed more fully in the preceding chapter.

The nominal size and outline of the opening in the die block is identical with the blank dimensions, except for the following allowances:

1. Blanks have a tendency to expand somewhat after being cut. This is probably due to a slight return of the metal along the lines in which it has been stressed in compression. The condition can be ignored on average work, but a slight allowance should be made on small blanks where tolerances are very close.

2. Blank dimensions increase in the direction of any shear angle to an extent proportionate with the height of shear.

Since both of the above conditions will require making the die opening less than the nominal blank size, the designer should specify that the opening be made undersize by a liberal figure, to be increased as necessary by actual die tryout.

Filler Block

At times it will be advisable to provide an intermediate part between the die block and the die shoe. This part can be used to build up the height of the die block, to adapt an extra-small die block to a larger standard-sized channel in the die shoe, to provide a base for various accessories when it is inadvisable or impractical to mount them directly on the die shoe, or to retain and give support to hard-alloy die block sections.

The filler block (or adaptor) is usually made of a higher grade of material than the die shoe but not as hard or wear-resistant as the die block.

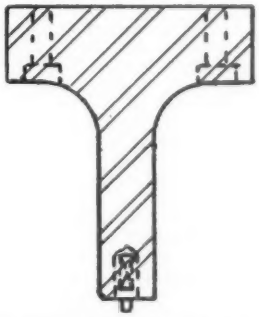


Fig. 3-10. Punches must often be enlarged at the base for greater rigidity, but care must be taken to avoid heat-treat failure. Shedder or stripper pins are employed to prevent blank's adherence to punch.

Die Shoe

The die shoe functions primarily as a base for the complete die assembly and in turn is bolted or clamped to the bolster plate over the press bed.

To facilitate this mounting, a clamping flange is provided around the outside of the die shoe. If the die is large and heavy, U-slots are provided in the flange adjacent to the die shoe corners to permit attaching chains for moving the die mechanically. Eye bolts or swing bolts may also be used to facilitate moving the die.

Punch

The blanking punch must be a perfect mate to the inside contour of the die block, with the necessary radial clearance being deducted from the nominal punch dimensions. The punch is usually designed with a wide shoulder to facilitate mounting and to help prevent deflection under load.

Especially in the case of smaller punches, the punch may be held in a retainer which in turn is mounted against the punch holder. It is inadvisable to extend either punch or retainer very deeply into the punch holder or to let the blanking load be taken on a very small area directly under the punch holder shank if there is one.

The strength of a small punch can be improved by increasing its cross-sectional dimensions above the cutting end (Fig. 3-10). However, this larger dimension must not start where it will contact stripper plate or die block when die is closed.

The punch is usually solid, although sectional construction may be employed on large dies.

The minimum length of the punch must provide for its extending far enough into the die block opening to insure complete shearing of the blank. Where the stock is fairly rigid, the blank snaps out as the fracture occurs and it will not be necessary for the punch to traverse the full stock thickness. Advantage is taken of this, because a shorter stroke speeds up the operation.

When using drop-through construction, the more-ductile materials, intricate blank outlines, and small radial clearances will probably require the punch to descend further in order to clear the blank from the die opening. In that case, the longer the straight side wall in the die opening, the further the punch must descend.

The length of the punch must also provide for the anticipated number of regrinds. Thus, the average amount of

stock removed per grind times the number of regrinds is added to the minimum punch length.

Small, thin blanks with simple contours may tend to cling to the punch on its return stroke, and particularly if the work is lubricated. This condition can be corrected or protected against by specifying one or more small-diameter shedder or oil breaker pins through the punch (Fig. 3-10). Pins should be set off center, so as to tilt the blank permitting it to fall or be blown toward the back of the press.

The length of the shedder pins must permit spring pressure to hold them extended about ¼" beyond the punch's cutting face when free of work load. Deflection of the spring coil (difference between free and compressed lengths) must be sufficient for blank pressure to push the pin back into its seat until relieved by severance of the blank.

Shear is not normally added to the blanking punch since the blank is distorted as a result. Shear can be used on the punch (1) if the blank can be straightened in a later forming operation, (2) if the blank requires a slight curve or radius, or (3) if a circular blank requires a concave shape.

When shear is applied to the punch, the shear height must be calculated before the over-all punch length can be obtained.

Back-Up Plate

In many cases, it will be advisable to provide an intermediate plate between the punch and the punch holder. This back-up plate is used to build up the length of the punch, to provide a base and insurance against punch deflection when the punch does not have a shoulder or base flange, to prevent the hardened punch from being pushed into the softer punch holder, or to carry various accessories when undesirable to seat them in the punch holder.

Punch Holder

The punch holder (or punch shoe) is the plate to which the punch and other parts in the upper half of the die assembly is mounted and which in turn is clamped or bolted to the press ram. It is provided with a clamping flange around its outer edge and, if the die is large and heavy, slots are cut into this flange for fastening chains when moving the die.

In most small and medium dies, the punch holder incorporates a shank extending upward and which is clamped in a recess provided on the press ram. This is a further help in proper positioning of the die assembly.

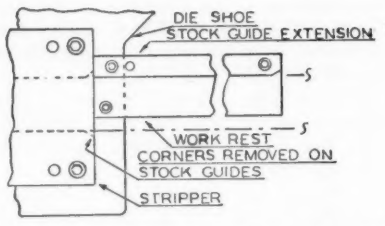


Fig. 3-11. Stock guides of the strip type and the back guide extension must be designed so as to facilitate starting of the stock strip.

Die Set

Whenever possible, the die shoe and the punch holder together with two or more guide posts constitute a standard commercially-available die set.

If a standard die set is not available, guide posts should be specified in the design. These prevent the shifting of die halves in relation to each other. On small dies, two posts and corresponding bushings are usually sufficient, but on large or wide dies four should be employed.

These posts and bushings are press or expansion fitted in precision bored holes provided in properly-positioned bosses on the die shoe and punch holder, and are sized to provide a slip fit. When die is fully closed, upper ends of posts should be about ½" below the upper surface of the punch holder. Precision-matched guide-posts and bushings are commercially available in many sizes.

Stop collars around the guide posts, or vertical stop blocks welded on the shoe, prevent tools from bumping when die is being moved or in storage, and make it easier to adjust the press shut height to suit the die.

Extra precautions must be taken when bolting a die into an inclined press. The use of strap clamps should be discouraged because the die has a natural tendency to shift under impact and vibration, due to the die members being mounted on inclined planes. For these dies, direct bolt fastening is recommended, in which bolts pass through close fitting holes in the die set and are secured in threaded holes in the ram or bolster. The shifting of the die member is thus limited to the clearance between the bolt and its mating hole in the die member. The greater the number of bolt holes in the die, the greater will be the cost of the die, but also the safer it will be. Even on those dies having a shanked punch holder for use on presses providing for clamping to the shank, positive through bolts should also be used in every case.

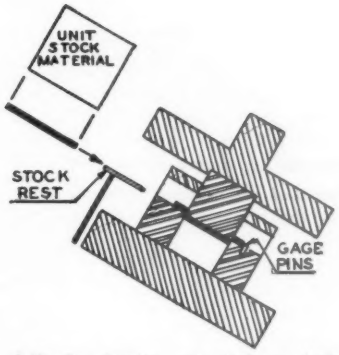


Fig. 3-12. For locating unit stock on inclinable presses, a system of gage pins is usually employed.

Stock-Guides

Front and back stock-guides or gages are needed to hold strip stock properly aligned with the die (Fig. 3-11). These are usually strips of steel of appropriate size, bolted to the die block.

When stock is fed automatically, the facing sides of these guides should be exactly parallel. The distance between them should be the maximum stock width plus a safety allowance of .004" to .008".

When the need for using various stock widths is anticipated, bolt-holes in the stock-guides can be elongated at right angles to direction of feed. This will not only permit the adjustment of stock guides for various stock widths but will provide the means of compensating for wear on guide faces, which must be reground from time to time, depending on the accuracy required.

On the loading side of the die, the inside corners of the parallel stock-guides are cut on an angle (Fig. 3-11) to facilitate starting of the stock strip. Also, for the same purpose, the back guide is often extended beyond the edge of the die and a work rest is provided for support of the stock being loaded.

When short lengths of fairly heavy or wide strip stock are used and are fed manually, the front guide is usually omitted. In such instances, the back guide extension is virtually a necessity in order to provide adequate bearing surface for the strip. The front guide is less necessary in the case of inclinable presses, since gravity will help keep the stock properly aligned against the back guide.

Unit stock is usually fed from the front of the press and inclinable presses are used whenever possible, in order that stock be fed rapidly with gravity carrying the piece back into position against the guides (Fig. 3-12). Particularly where the unit stock is irregular in outline, a system of pins rather than strips can provide the means of locating it. With unit stock, locating must be provided on two sides as well as on the back.

Stock-guides are usually omitted altogether when the die is intended for extremely short runs and scrap stock of varying dimensions can be utilized; however, dies without stock-guides are never used on inclinable presses, because of the difficulty which would be experienced in positioning the stock.

In blanking large areas on pillar presses, where sheet stock is used, stock-guides are usually provided along one side and opposite end of the press. Two short guides with a space between them can substitute for one long guide in providing a lengthy line of support.

In some cases, the device used in stopping the stock at the correct blank length is a fixed pin or strip-type stock-guide. This simplified method of stopping the stock is most widely used on short-run dies and where stock is fairly rigid. In such dies, the side stock-guides—if supporting the stripper plate—must be thick enough to enable the stock to be raised and slid over the end guide or stock stop.

Stripper Plate

The opening in the stock strip created by punch penetration closed in slightly the instant the cutting edge has passed. On the return stroke of the punch, the stock tends to adhere to the punch and be lifted by it. This

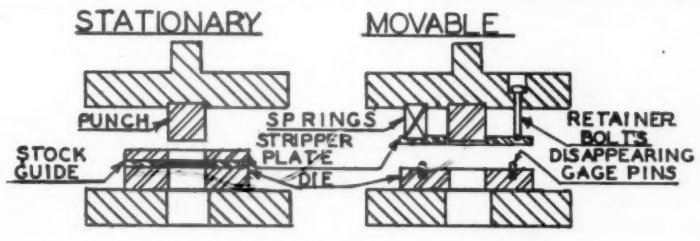


Fig. 3-13. Stationary and movable spring-type strippers.

condition is most severe with the more-ductile materials and becomes increasingly worse as press-tools become dull.

Since this action interferes with the feeding of stock through the die, some device must be used to strip the stock from the punch and leave it free to be advanced. The simplest arrangement usually is a plate parallel with and above the die surface. This plate can be either stationary or spring-mounted (Fig. 3-13), and must be elevated sufficiently to permit the stock to be fed freely between the upper die surface and the under surface of the stripper plate. A third type of stripper is operated by a knock-out arrangement.

Strippers are described more fully under the type of die they are most commonly used with.

An opening must be cut through the stripper plate for free passage of the punch. By rule of thumb, this opening can be 1/16″ larger than the blank size, on all sides. If the stripper is used to guide the punch, this clearance must be considerably less and be virtually a slip fit.

The following formula* can be used to calculate stripper thickness (X):

$$X = \tfrac{1}{8}\ (w/3 + 16t)$$

Where, w = width of stock strip

t = thickness of stock strip

X = thickness of stripper plate in inches (corrected to nearest eighth of an inch)

Example: If the stock strip is 3″ wide and 0.050″ thick, by substitution

$$X = \tfrac{1}{8}\ (3/3 + 16 \times 0.050)$$
$$= \tfrac{1}{8}\ (1 + 0.800)$$
$$= 1.8 \text{ corrected to } 2/8 \text{ or } \tfrac{1}{4} \text{ inch}$$

This formula can be used when all stripping is performed inside the (normal) supported periphery of the stripper.

In the event of an unsupported projection on the periphery of the stripper, an additional strength factor of 50% more-or-less is added to "X" as calculated above. Further allowance should be made for any counterboring that may be necessary in the stripper.

On stationary strippers, use of the above formula eliminates the need for estimating the stripping pressure.

The surface of the stripper plate which contacts the work should be machined, and preferably ground.

Stock Stop

An automatic end stop (Fig. 3-14) is usually provided, in order to eliminate any necessity for the operator to lift the stock strip over a solid stop or end-gage, each time it is advanced.

Various types of automatic stops are shown in the chapter on progressive dies, and also in various die examples described throughout this book.

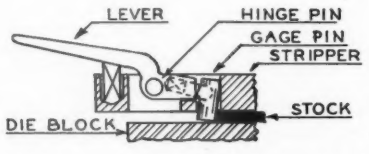


Fig. 3-14. A popular commercially-available automatic stock stop for dies having stationary strippers. The unit is mounted in the stripper. As the punch engages the stock, a set screw in the punch holder strikes the lever, lifting the gage pin so it snaps over and rests on the stock which is free to be advanced when operation is completed.

Stock Supports

In order to facilitate feeding of stock, it will often be desirable to support the stock strip on the loading side of the press in line with the top surface of the die block. On light-gauge stock, it is advisable to mount this work-rest directly on the end of the die (Fig. 3-11). The work-rest is also used to support the back stock-guide extension previously mentioned.

Especially when stock is hand-fed, the work-rest width should be less than the stock width or should be cut away for finger clearance to enable the operator to guide the stock in close to the die.

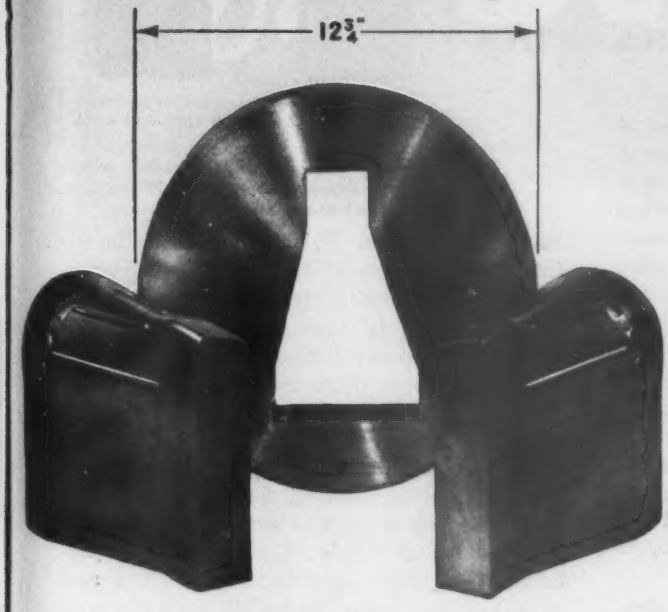
When blanking large areas, the work-rest is usually secured to the side of the press and is not built into the die.

Spring-loaded, round-nose pins can be provided in the die block or the die shoe to lift the stock strip and permit it to be advanced more easily without friction on the flat-faced die block and without burrs around blank openings catching on the block. These pins should not extend more than ⅛″ above the top die surface.

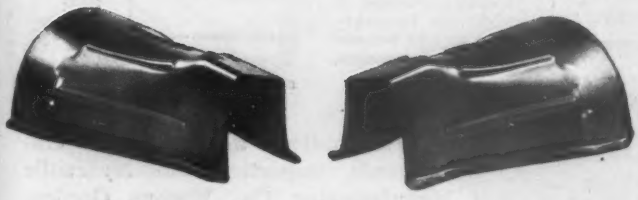
*From H. Effgen, TOOL & DIE JOURNAL, Sept., 1948

Figures 1, 2, 12 and 13, and those recommendations pertaining specifically to inclinable presses have been adapted from J. I. Karash, TOOL & DIE JOURNAL, June, 1949 through Feb., 1950.

Just this tooling ...



makes 2 drawn parts...



by Hydroforming

What would it cost you to tool this job?

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U.S.A.

HYDROFORM TOOLS ARE CHEAPER TO MAKE

The parts illustrated below are right-hand and left-hand sections of a stainless steel duct—a jet-engine component. The one draw ring shown was used to Hydroform *both* parts, by simply turning it upside down to draw the opposite section. The punches were made of cast iron, machined to shape.

Liberal clearance is permitted between the punch and draw ring—up to 50% of the thickness of the material being drawn. Punches can be made of inexpensive, easy-to-work materials—mild steel, brass, Kirksite, plastics—depending upon the material and shape of the part.

GET BETTER PARTS... BIGGER SAVINGS... BY HYDROFORMING

You'll save on tool costs, *certainly*, by Hydroforming—and produce parts of *higher* quality, in *fewer* operations as well. Bulletin M-1759-1 gives detailed information on this simplified deep drawing process. Write for your copy. For data pertinent to your production, call in a Cincinnati Milling field engineer.

CINCINNATI

Hydroform

HEAVY PRESS COMPONENTS INSPECTED BY ULTRASONICS

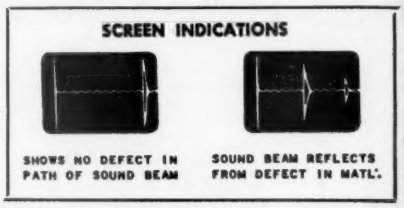
Preventive maintenance is taking on new meaning to users of large forging presses. Heretofore, lubrication scheduling, periodical adjustments and replacement of fast-wearing parts, and regular visual inspections have been the leaning posts on which press shop management based their hopes of avoiding serious mechanical failure and prolonged press shut-downs.

Previous inspection methods were good and are still as necessary as ever. Signs of scoring, fretting, corrosion, end play, out of round, and a hundred other conditions are vital in a program designed to anticipate and avoid major trouble. But what about internal defects in structural members of the press, in the huge die blocks?

With giant presses growing ever bigger, with magnesium and aluminum and titanium forgings up to 500 pounds and more, excessive pressures beyond the intended capacity of the press become more critical. Die failure, misalignment, oversize billets, and other conditions all may produce added strains on press members. Fatigue failure is a greater possibility. With the tremendous pressures exerted, actual breakage of one press part could result in extensive damage to other press parts.

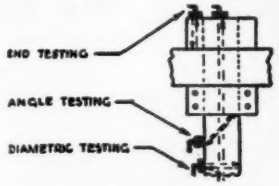
Now, flaws deep within a huge press member can be detected and analyzed — and the part replaced if necessary — before actual breakdown occurs. This inspection as to the internal soundness of a component is accomplished by ultrasonic techniques.

Sperry Reflectoscope in use testing a 36" guide column on giant 18,000-ton Mesta hydraulic press, operated by Wyman-Gordon Co. Crystal search unit is a light hand piece which, with the portable control instrument, permits testing any part of the press.



Accurate diagnosis of oscilloscope screen patterns depends upon the skill, training, and experience of the operator.

Briefly, this is done with an instrument such as the Sperry Reflectoscope, which generates ultrasonic (high frequency) vibrations, sending these sound waves through the workpiece and measuring the time taken for them to be reflected back either from the opposite wall or from an internal defect if any exists. The reflected vibrations are pictured on an oscilloscope. Analysis of the picture determines the presence, character, distance and extent of any flaw. Depending upon the condition observed, its growth can be charted in order to schedule replacement of parts without prolonged shut-down.



Showing directions in which high frequency sound may be beamed into a press member.

Among press builders and users who employ ultrasonic inspection are Hydraulic Press Manufacturing Co., Wyman Gordon, Farrel-Birmingham, Mesta Machine, Alcoa, Chase Brass, Boeing and Douglas. Press members commonly tested include guide columns, strain rods, pistons, gland nuts, base pads, and pump shafts.

Heppenstall Company, one of the country's largest producers of large forged die blocks, regularly uses ultrasonic inspection as a quality check on forgings to be shipped to customers. Their five years of experience with this method have enabled them to constantly improve their forging techniques, since many variations can occur in a forging that resist detection and thorough analysis by other inspection methods. These undetected variations in forged material were necessarily passed on to the customer, before the advent of ultrasonic inspection. In many instances, what was passable yesterday is a reject today.

Only SUPERIOR

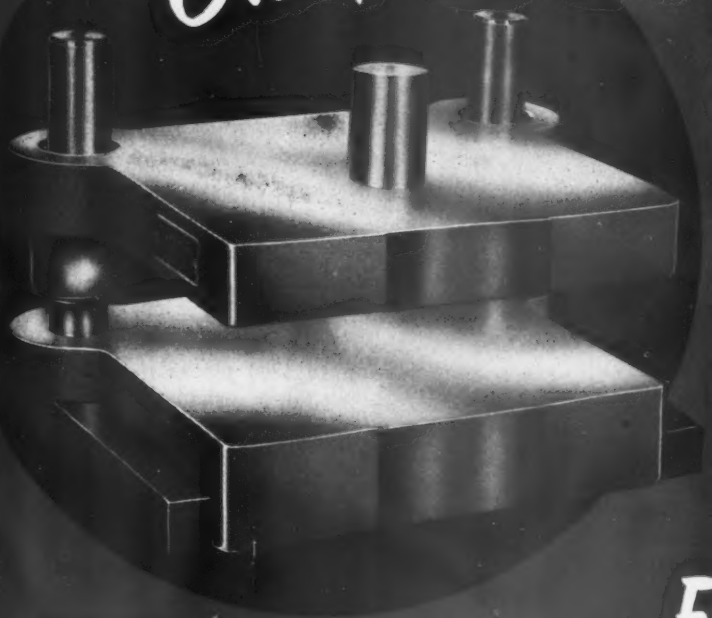
PRECISION—ALL STEEL

DIE SETS

Give You These

3 Features

For Safer Faster Handling



1 SAFETY FLANGE

protects fingers by providing roomy gripping space on either side of the die shoe. This flange may be mounted flush or on the edge of the die set and is welded in place. *There is no extra charge for this valuable safety feature.*

2 LOCK JAW LIFTING DEVICE

removes the danger of handling large die sets. Heavy steel components of this device are welded in place forming an integral part of the die set. They are positioned to insure proper balance when the set is lifted by either chain fall or crane.

3 E-Z LIFT SLING CHAIN

is especially designed to fit the safety flanges of the die sets. Male jaws attached to the sling fit quickly into place for immediate lifting. There is no need for screw clamps, eye bolts, or lifting lugs. Nor is there danger of distorting stresses being set up in the die or set because of improper lifting.

It's no longer necessary to take needless risks in handling die sets. Risks that might easily injure the hands of skilled die makers, ruin costly dies in process or completed, or even damage press equipment. Safety features of Superior die sets have eliminated all of these dangers and have speeded up the overall handling of sets from the bench to the press. Prove to yourself the merits of these safety features in both small and large die sets.

FREE CATALOG—*Write today for this helpful data on Superior die sets and die makers' supplies.*

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ASSEMBLY LINE METHODS WITH SMALL PRESSES GIVE HIGH PRODUCTION

By William August
Vice President and General Manager
BALDWIN PRODUCTS CORP.
San Gabriel, California

OPERATIONS IN THE MANUFACTURE of electronic components and automotive accessory items have increased 100 to 1 through assembly line production methods made possible by the use of a dozen small 4-ton punch presses with big press features which stamp 1800 pieces each per hour in two 48-hour shifts per week at Baldwin Products Corp., San Gabriel, Calif.

At Baldwin we manufacture a wide variety of electronic hardware and automotive parts out of stainless steel for use in the jet aircraft, guided missile and automotive fields.

As most of the parts are made to close tolerances, the ability of these small Kenco presses to hold adjustments over extended periods of time, especially on coining operations, is of extreme importance to us.

Employing these bench type presses, some in a reclinable position, on a continuous basis and set up around a square circle, we have been able to reduce our down time appreciably as die sets may remain on the presses throughout the entire production operation.

We have had most of our 42 employees, working two shifts daily for more than four years, stamping up to 1800 pieces per hour on these presses with few production stoppages due to breakage, die set changes or repairs. Except resharpening dies and minor service adjustments, presses have furnished uninterrupted service, so important in subcontracting work for the defense program.

With a relatively small investment we are able to achieve higher production required by our type of operation employing the smaller 4- and 5-ton presses which require fewer die set changes, than could be achieved with larger punch presses.

. . . *Continued on page 74*

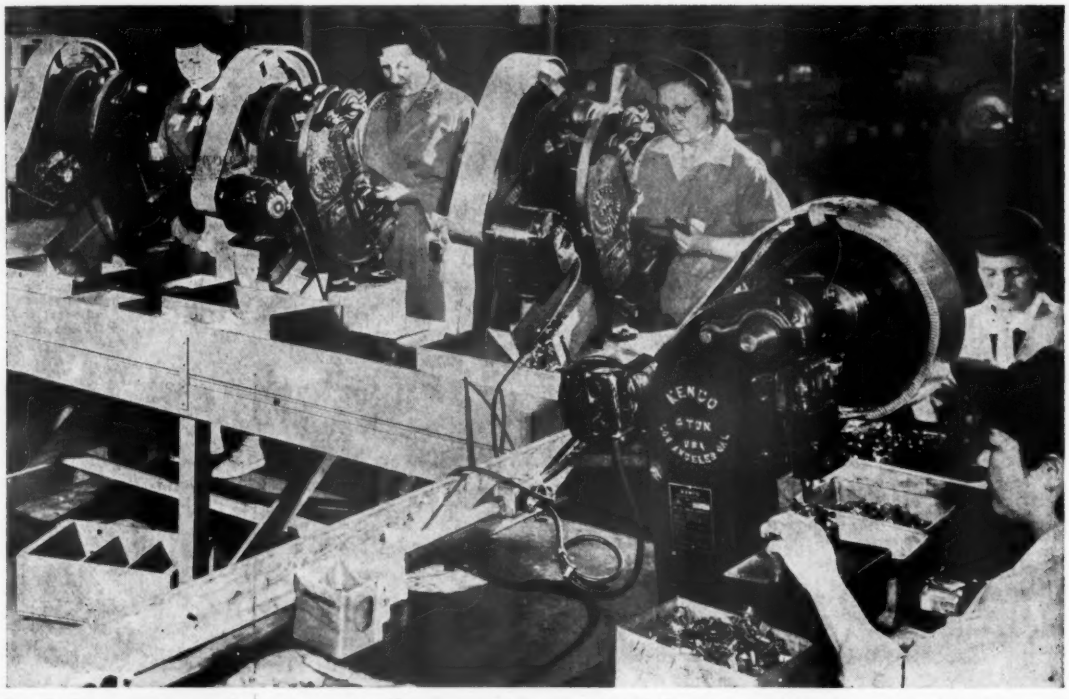

Fig. 1. By mounting punch presses on benches arranged in a square and die sets remaining in presses through an entire operation, production runs at Baldwin Products Corp. are stepped up and down time reduced.

a few typical examples of how

SPIRAL

solves special cutting tool problems!

IN HIGH SPEED or CARBIDE

Whether you have a tough cutting tool problem or just an ordinary "special" why not find out how Spiral can give you maximum tolerance control . . . and longer tool life with a Spiral Tool especially designed to simplify a given operation or to combine several operations into one.

***FREE* TOOL ENGINEERING HELP . . .**

For a quick answer to your specific cutting tool problems, send complete details, including tool, part print and specifications. Write for a free copy of latest bulletin showing other examples of SPIRAL time-saving tools.

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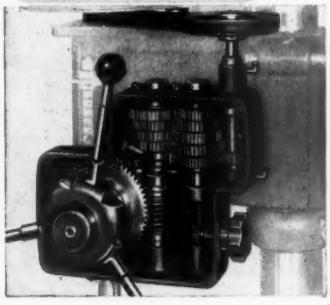
NEW!

CLAUSING

18" HEAVY-DUTY POWER FEED DRILL PRESS



★ Drills 1" cast iron, ¾" steel ★ No. 3 Morse Taper, 6½" spindle travel ★ HEAVY-DUTY GEAR-DRIVEN POWER FEED TO TAKE FULL ADVANTAGE OF THIS BIG TOOL AND JOB CAPACITY.

An 18" *heavy-duty* drill press, with larger tool and job capacity, PLUS a *heavy-duty* GEAR-DRIVEN power feed to make effective use of its capacity — those are the brief facts about this fine new Clausing development.

The power feed, with its large heavy-duty gears, is positive and sure — NO belt slippage to reduce power. Feed selection is instant — BY DIAL — no belts to change. Add the Clausing features of new spindle bearing engineering, vernier depth stop, and exclusive head and table positioning mechanism — and you know this is a tool that can save you plenty on both set-up and operating time. Get all the facts — send for new literature today.

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FOR PRODUCT INFORMATION USE CONVENIENT INFORM-A-GRAM CARD

Carbide Insert Tool Increases Production and Tool Life

Forty-six percent reduction in grooving time in machining 41-⅜" diameter by 27-⅜" long cast steel cable drums was recently secured when a leading midwestern manufacturer of heavy earth moving equipment switched from high-speed tools to 1-⅜" diameter Kennamatic

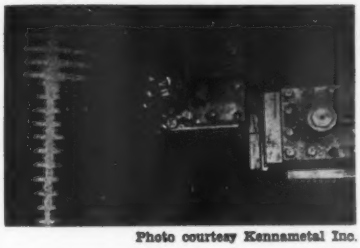


Photo courtesy Kennametal Inc.

tungsten carbide insert tools. This interesting operation is performed on a 50-horsepower Cincinnati Hypro vertical boring mill and consists of cutting a 1-7/16" pitch groove, 5/16" deep at 13 to 15 revolutions per minute. When finished it will enable the drum to accommodate a 1-¼" diameter wire rope.

Time required to groove one drum with special shape forged high-speed steel tools was 9.4 hours. It also necessitated 40 cuts of varying depths and 3 tool changes and resharpenings. Now with their use of Kennamatic cemented tungsten carbide insert tools, one drum is grooved with 19 cuts and requires only 5 hours operational time.

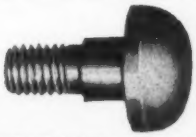
Eighteen Drums Machined Without Regrinding

Three drums are grooved with one tool cutting position. Since each end of the insert provides three new cutting edges, 18 drums are grooved before the tool is removed for regrinding. To resharpen the tool only the insert's ends need to be ground. There is no form or clearance to grind as was formerly required with high-speed steel tools.

The 1-⅜" diameter tungsten carbide inserts eliminate tool resetting and picking up the lead heretofore required with the other tools.

TRAUB
Automatic Screw Machines

★ faster set-up time . . .
★ faster production . . .
★ greater simplicity . . .
★ multiple operations done simultaneously . . .
★ easier caming . . .



To illustrate let us consider a shoulder screw and compare methods of production.

WITH TURRET—6 Operations	OPERATION	WITH "TRAUB"—5 Operations
Feed-out and close collet	1	Feed-out and close collet
Box-tool first shoulder	2	Turn first shoulder with single point turning tool from front slide
Box-tool second shoulder	3	Turn second shoulder with the same single point turning tool from front slide, and thread
Thread	4	Form head
Form head	5	Cut-off
Cut-off	6	

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STANDARD DIE SHOP PRACTICE

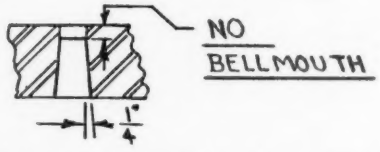
Courtesy of
Atlantic Tool & Die Company, Cleveland, Ohio

GENERAL

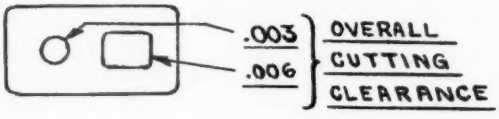
1. Check drawings for any special notations.
2. Remove all unnecessary sharp corners and edges. Chamfer edges of all screw and dowel holes.
3. Stamp brand of tool steel on all parts if possible.
4. Check hardened parts for hardness and cracks before proceeding with work.
5. Check die shoes for parallelism and alignment.
6. Check finished job after tryout for shear marks, slugs, alignment, etc. Check samples for size and keep for future reference.
7. Apply heavy coat of grease before packing for shipping out-of-town jobs.
8. Use common sense in applying the following standards.

DIES

1. Check filed contours before and after hardening for peening and bellmouth, and for size.
2. Remove scale on die contours.
3. Tapered die openings to have ¼° taper on one side, ½° overall—unless otherwise noted.

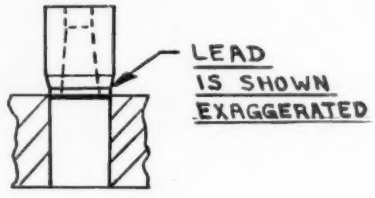


4. Length of straight portion in die opening to be as per drawing specification, with no bellmouth allowed within 2/3 from top.
5. Round pierce openings and bushing holes to be jig-ground to size.
6. Grind sectional dies whenever practical. Sections must have closed joints.
7. Work to drawing specifications for cutting clearance. It may not be the same for both blanking and piercing holes. For example:

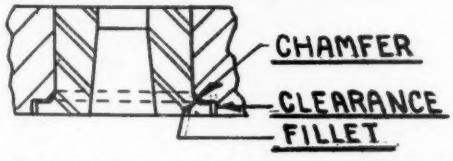


BUSHINGS — INSERTS

1. Grind concentric, inside and outside, all pierce and pilot bushings larger than 1/16" inside diameter.
2. Lap all unground bushings on the inside and polish the outside.
3. All bushings and inserts to be tight drive fit. Larger ones to be press fit.



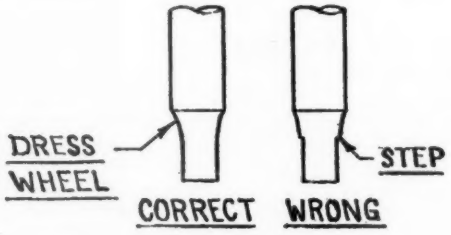
4. All bushings and inserts to have slight lead on bottom and to be pressed in from top of retainer.
5. Grind split bushings and inserts whenever practical. All sections must have closed joints.

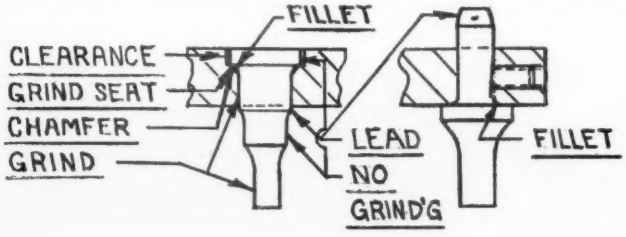


6. Shoulder bushings must have generous fillet on shoulder and must have clearance in shoulder pocket.

PUNCHES — PILOTS — SPRING PLUNGERS

1. Round punches and pilots to be ground concentric. Blended portion must be free of steps.
2. Roll-harden very small round punches when practical.
3. Any odd shaped sheared-in punches that cannot be finish ground, to be stoned after hardening.
4. Punches and pilots to be drive fit in holder plate. Allow generous fillet on head, and grind seat of punch. Allow slight lead on shank. Any locating or holding flat on shank to be ground properly.





. . . Continued on page 128

175 TONS OF PRODUCTION

DYNAMITE

Send for complete information on the BRANDES press line. Catalog lists specifications on 30 ton to 750 ton BRANDES Presses.

This Brandes 175 ton, wide bed press, is built to joint Industrial Conference standards. Die clearance is 28" front to back, and 60" right to left. Press is precision built, featuring rigid over-all construction and engineered to meet progressive die requirements.

BRANDES' PRESS FEATURES

- **Minimized Vibration**
- **Large Bed Area**
- **Precision Roll Feeds**
- **Rigidity**
- **Smooth Operation**
- **Patented Long Multiple "V" Ways**

THE BRANDES PRESS COMPANY

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UNITED AIRCRAFT chooses

Zagar engineered drilling

for J-47 Jet Engine Parts

Zagar evolves best method for drilling 383 holes in header plates and manifold for liquid - to - liquid heat-exchanger. Photographs by courtesy of UNITED AIRCRAFT PRODUCTS, INC., Dayton, Ohio.

The job: to save most time and money in drilling 365 holes .200 diameter and 18 holes 5/16" diameter. Zagar *engineered drilling* licked it.

● You, too, can profit from the often demonstrated ability of Zagar gearless drillheads to drill hundreds of holes at one pass. Zagar's engineered drilling permits record-breaking performance without drill breakage. Used alone or combined into 4-post machines, Zagar gearless drillheads drill any material and any size hole on all centers as close as twice the drill diameter. No application is too difficult for Zagar standard machines 16", 24", 32" and 40", or for special machines to fit your needs exactly. All this, at a new low cost of tooling.

Ask on your letterhead for our Catalog T-6

ZAGAR TOOL, INC.

24000 LAKELAND BLVD. • CLEVELAND 23, OHIO

Zagar TOOLS FOR INDUSTRY and SPECIAL MACHINERY

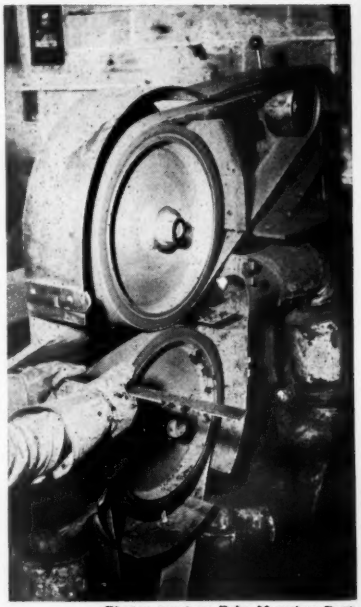
Two Abrasive Belts Double Flat Part Grinding

Two coated abrasive belts, running over vertically opposed contact wheels, doubled the production finishing rate of carpenter squares for one midwest manufacturer. This setup permitted both sides of the flat metal product to be ground at once.

Previously, the squares were offhand polished on abrasive coated setup wheels. The original objective in converting from setup wheels to coated abrasive belts was to take advantage of the better finish produced and the reduced cost in operation possible with belts. The double belt machine was a subsequent development.

The machine consists of two coated abrasive belt grinders mounted in one frame and driven by one electric motor. The bottom belt runs vertically and the top belt runs horizontally.

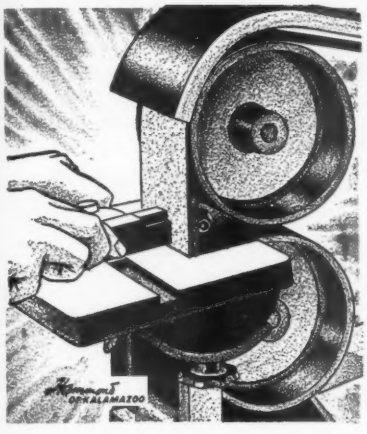
. . . Continued on page 72



Photos courtesy Behr-Manning Corp.

Fig. 1. Both sides of flat metal part being ground in one operation. Square is passed through fixed gap between two coated abrasive belts. Contact wheels on shafts at fixed center distance balance grinding pressure across the square. With contact wheels turning same direction, pull on square is balanced.

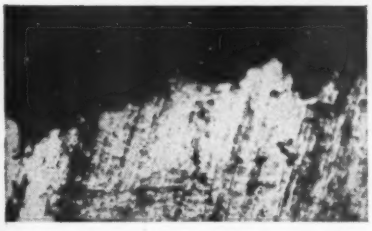
NEW 3M DISCOVERY obsoletes all other abrasive belt methods for sharpening carbide tools!



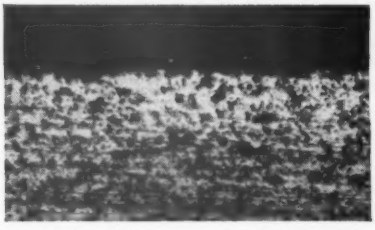
Here is a completely new machine—a completely new method—for belt sharpening tungsten carbide tools. Gives a longer-lasting, more precise edge than ever before possible without diamond wheels and highly skilled operators. Developed by 3M, designed and built by Hammond Machinery Builders, this machine uses a specially designed 3M Abrasive Belt passing over an absolutely flat carbide platen. This special work surface—hard as the tools you finish—enables you to finish *every* cutting surface. That means you can finish the all-important *top* of the tool, impossible with previous belt methods. All lands are restored to original *flat* planes—not hollow-ground.

Look! Micro-photographs* prove new 3M Carbide Tool Sharpening Method gives a better finish than ever before possible except on a diamond wheel!

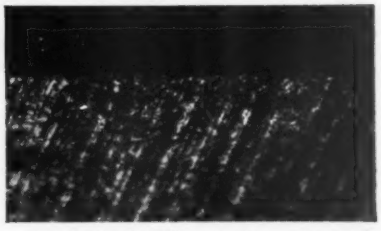
*These photos, representing 1/100 of an inch, show the cutting edge of a single point tungsten carbide tool.



Grinding with green grit silicon carbide wheels leaves this rough jagged edge leading to premature breakdown of cutting edge—result short tool life, frequent reshaping, costly set-ups and loss of production efficiency.



Finished with 150 grit "Tri-M-ite" Resinite Paper Belt, after rough grinding with a 60 grit green wheel, gives this near-perfect edge. Even an unskilled operator can attain results like this! Compare this picture with the one at right . . .



. . . finished with 180 grit diamond wheel. Here is perfection—on a brand-new tool! These micro-photographs show the slight difference between the 3M-sharpened tool and this diamond-sharpened tool! Here is conclusive proof that the 3M Carbide Tool Sharpening Method comes as near perfection as it is possible to get—at only a few cents per belt!

GET ALL THE FACTS FROM YOUR 3M REPRESENTATIVE about this amazing new method for sharpening carbide tools. He will be glad to give you full details!

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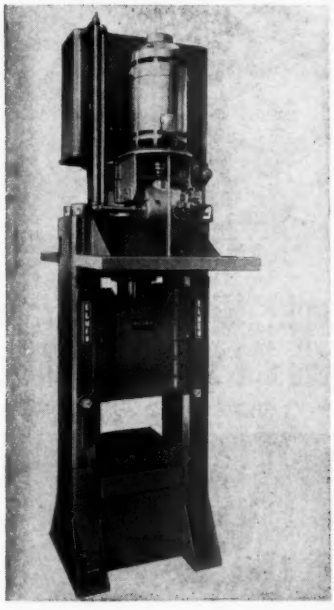
Pipeless Hydraulic Press

A 500 ton hydraulic drawing and forming press has been specially designed by Elmes Engineering for cold drawing and nosing artillery projectiles. This press is part of a radically different shell-forging process representing a most efficient and economical compromise between old hot forging methods and the newest steel extrusion processes.

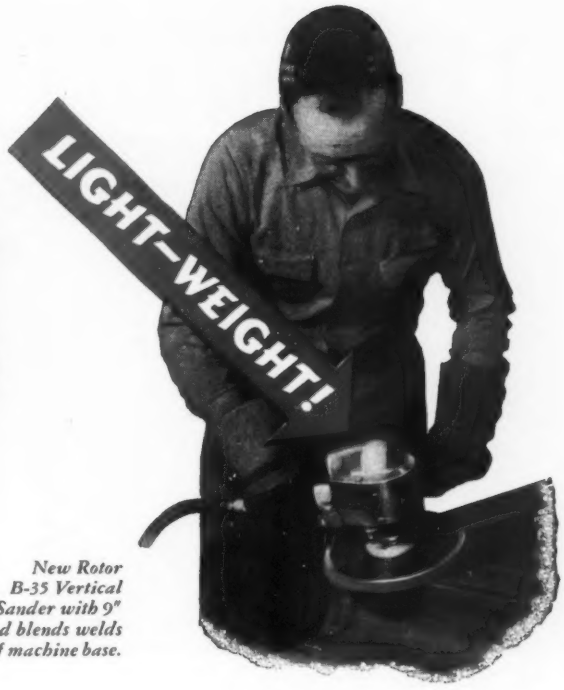


The die space has been made smaller than standard; the intense pressure developed in this process requiring less area.

This press embodies the revolutionary Elmes principle of pipeless construction. There is no piping in the main hydraulic circuit. All high pressure fluid is conducted through short, direct passages drilled in the structural parts. The result is exceptionally smooth, quiet, shockless operation and remarkably low cost maintenance, with downtime practically eliminated. This particular press, in fact, is a "double pipeless" type, having two pipeless units for increased operating speed.

Write for illustrated Bulletins 1010-B and 1011. Address American Steel Foundries, Elmes Engineering Division, 1150-Y Tennessee Avenue, Cincinnati 29, Ohio. **Circle No. D2.**

New Rotor B-35 Vertical Grinder with 6" cupwheel smooths a casting.



New Rotor B-35 Vertical Sander with 9" pad blends welds of machine base.

Speed up the job with these NEW ROTOR VERTICALS

Talk about power! And these new Rotor Verticals are easy on the muscles!

YOU should try these new Rotor "power houses"! See how fast they remove metal. See how easy they are to handle . . . light in weight (only 10¾ lbs.) because of magnesium castings . . . comfortable balance because of adjustable handle angle.

Ask for a demonstration! Write for free copy of Catalog No. 40.

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Molds of SPEED TREAT Plate Steel Turn Out Trafficones by the Thousand

- No doubt you have seen Trafficones along streets and highways where repairs or construction are in progress. They are molded of rubber and if struck by a passing motorist can't dent a fender, injure driver or workmen. Contractors and road builders like their low cost, their flexible resistance to breakage or distortion under constant use.
- The TRAFFICONE'S cone molds were speed-machined from Speed Treat (X1545) Plate Steel by Tri-Angle Tool & Machine Works, Los Angeles, California, for the Interstate Rubber Products Company, Los Angeles, makers of TRAFFICONES. Tri-Angle reports "wonderful success with this free machining steel over a number of years" and particularly like Speed Treat's low grinding and polishing costs and high lustre readily obtained.
- Speed Treat is widely used for rubber molds, plastic cavity retainer plates, short run trimming and blanking dies, punches and machine parts. Especially suited for flame or induction hardening as well as other treatments. Can be welded, brazed. Ask the nearest Speed Steels distributor.

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Produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division, Hammond, Indiana. Plants: Hammond and Indianapolis, Indiana

. . . Flat Part Grinding, from page 68

Rubber rimmed contact wheels support the belts where they contact the work and act as belt drive wheels. Two backstand idler pulleys, one in the frame base and one on the rear frame, maintain belt tension.

Center distance between the two contact wheels is fixed to maintain a gap between opposed abrasive belts equal to the final desired thickness of the square. However, the frame is adjustable to permit changes in center distance for grinding thicker or thinner stock.

Since the same three motor V-belts drive both contact wheels, both contact wheels run counterclockwise (as viewed from right side) at the same speed. With wheels of equal diameter the surface speeds of the belts are equal. But at contact points, the belts are moving in opposite directions. This balances the thrust or pull on the square being ground and permits the operator to retain full control of the work.

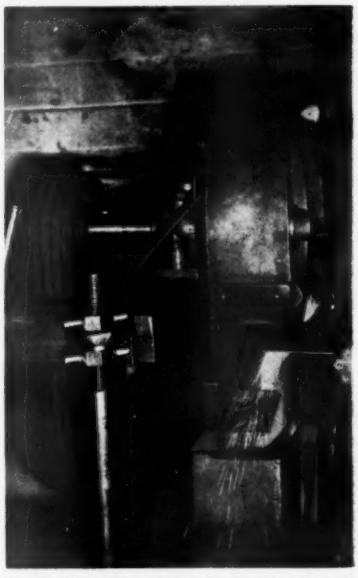

Fig. 2. Two threaded rods (in foreground) are the means for adjusting the center distance between contact wheels. By turning the nuts on the rods, the gap between belts can be changed to suit thickness of finished work. Notice the triple V-belt drive that turns both contact wheel shafts the same direction.

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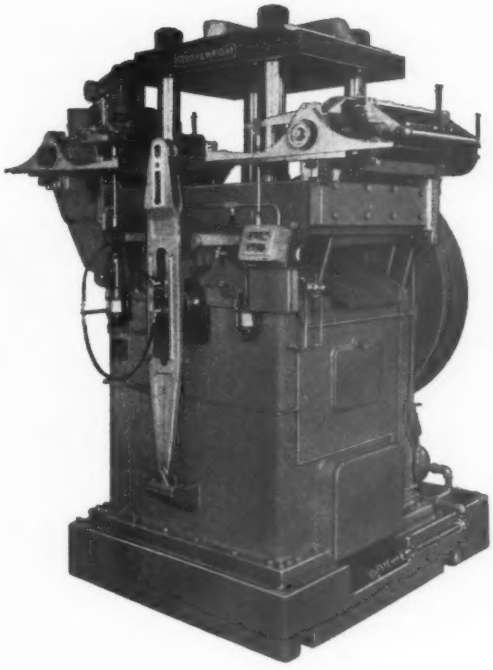
A PROFIT WITH EVERY STROKE



Our customers say that. It figures. One Dieing Machine does the work of five to ten conventional stamping presses. One stroke—a complete part. One inspection. One trip for parts removal. Speed—you can pull out the throttle. Die life—longer for two reasons. (1) Stability, minimum vibration, extreme precision of tools alignment. (2) Dies take less of a beating; less metal needs to be removed for sharpening. Our men can give you the whole Dieing Machine story. If you want to cut costs, now's the time to talk to one of them—a note from you will have an H & W man on deck promptly.

NEW CATALOG Up-to-the-minute facts on Dieing Machines. Capacities now range from 25 tons to 2500 tons. Catalog gives specifications up to 400-ton machine. Write Henry & Wright, 511 Windsor St., Hartford, Connecticut.

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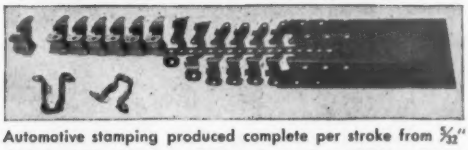
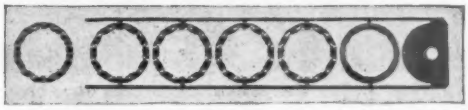
TYPICAL JOBS THAT SHOW A PROFIT AT EVERY STROKE

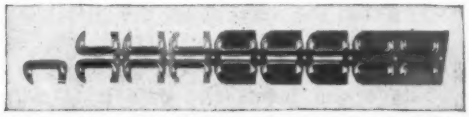


Automotive stamping produced complete per stroke from 5/32" thick by 13" wide hot rolled steel in coils on 200-ton Dieing Machine, single gear type, equipped with progressive die. Speed approximately 45 strokes per minute.

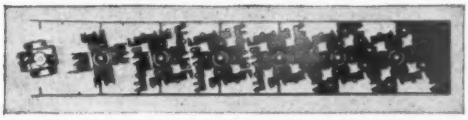


Ball bearing retainer produced complete in 75-ton Dieing Machine operating at speed of 95 strokes per minute. Made from 4 3/8" wide by .034" thick cold rolled steel.

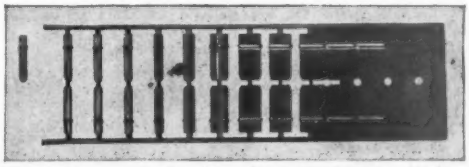
Ferrule. One completed piece produced per stroke in 50-ton Dieing Machine operating at speed of 90 strokes per minute. Made from 5/16" diameter by 7/8" long by .030" thick cold rolled steel.



C-Clamp Frame. Both halves produced complete in 150-ton Dieing Machine operating at speed of 65 strokes per minute. Material—cold rolled steel .086" by 4 3/8" wide.



Support bracket produced complete one per stroke in 150-ton Dieing Machine operating at speed of 60 strokes per minute. Made from .062" thick by 7 1/4" wide cold rolled steel.



Radio tube prong produced complete in 25-ton Dieing Machine at rate of 450 pieces per minute. Made from brass .012" by 1 1/16" wide.

Bathroom fixture produced in 60-ton Dieing Machine operating at speed of 100 strokes per minute. Made from .032" thick by 1 3/4" wide cold rolled steel.

Hardware item. One completed piece produced per stroke in 100-ton Dieing Machine operating at speed of 75 strokes per minute. Made from 3" wide by .040" thick cold rolled steel.

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

. . . Assembly Line Methods, from page 62

Fig. 2. The dies in this Kenco press have sheared 3 million pieces without re-sharpening. The work pieces are initial strips for electronic components cut from 2000-ft. coils of ¼ hard ⅜" stainless steel.

One of our production items is a small high chrome steel 5-in. band formed into a clamp for an automobile steering wheel knob which we have made for Hollywood Accessories Co. for a couple of years.

From the strip stock the metal is fed into the Kenco with a two stage progressive die which pierces and coins the piece in the first stage and forms and cuts it to 5-in. length in the second stage.

We have achieved a production rate of 1500 pieces per hour. One impressive feature of these small presses is their overload safety feature. A hardened and ground driving plate is dowel pinned to the flywheel, which will shear if excessively overloaded. This together with the positive single trip mechanism eliminates any damage to our dies.

Following this operation, the automotive clamp has a nut spot welded to it, with two simultaneous welds on a Federal welder, rebuilt to our needs. The clamp is bent at this final stage by the weld machine operator.

As we are interested in the unusual stamping jobs—problem manufacturing—we have tackled a number of difficult designs adapting them to fit the Kenco production set up. As many as 500 different items and parts have been produced for electronics work.

If the job calls for it we are able to provide multiple runs with all presses employing similar die sets. If necessary and production calls for it, we develop progressive dies. Along this line, we have designed multi-set dies with adjustable punches and die sections to make similar parts of different dimensions in the same die.

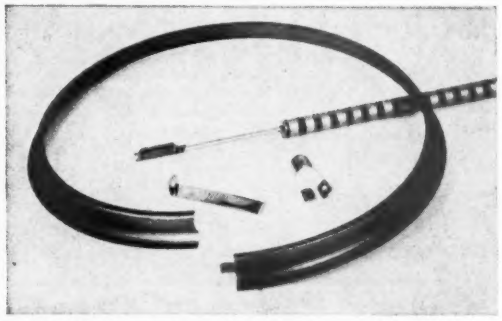


Fig. 3. Hub cup rings of 15" and 16" diameters produced in four operations, 5" bands formed into clamps for steering wheel knobs, and Protecto rod physical inhibitors for water tanks are some of the parts stamped out on Kenco punch presses at Baldwin.

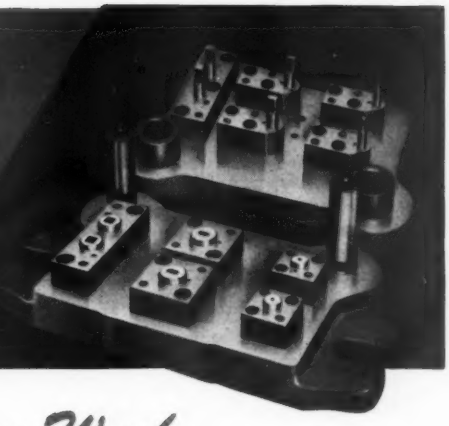
Fig. 4. Mounting a die in this press takes only a few minutes. These small presses handle some larger dies usually found only on heavier type presses.

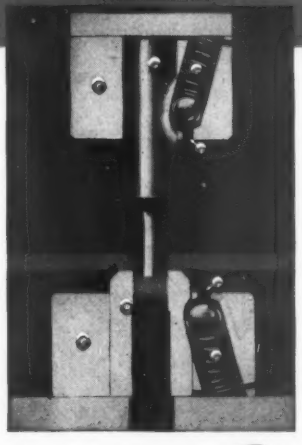
Another operation is the stamping of 15- and 16-in. dia. hub cap rings from cold rolled steel in four different operations for the Schmidt Metal Spinning Co. of Los Angeles. This is a particularly tricky operation involving stamping, riveting, forming and shearing to size.

By holding the ring in the die at a slight angle and with the two ends to be punched spread slightly apart, we are able to punch out a small tab on one end and notch the other despite a curved edge on the ring.

. . . Continued on page 141

You Save Time with R-B PUNCHES and DIES





How They Work . . .

R-B punches (A) and die buttons (B) are locked in standard or special retainers (C) which are mounted on the die shoes. A spring-loaded ball lock (D) produces positive radial alignment and vertical locking; *no additional keying is necessary regardless of the size or shape of the punch.* Up to ¾" stock can be pierced. R-B punches and dies are easy to insert; push and twist and they're locked. They're easily removed, too. Retainer holes (E) provide for insertion of tanged tool which releases ball and allows instant removal.

How They Save Time

IN DIE DESIGNING

R-B standardized retainers are available in three shapes and many sizes, and where necessary, R-B special retainers can be supplied. You save "time on the board" because you are working with *standardized* equipment.

IN DIE CONSTRUCTION

R-B punch and die retainers and special retainers are quickly, easily and accurately mounted without special machining. With them, you can save much of your skilled die-makers' time.

IN DIE OPERATION

HERE'S WHERE YOU *REALLY* SAVE. R-B punches and dies cut press down time for replacement to a minimum. They're instantly removed—quickly changed—yet accurately aligned when locked.

TOOL STANDARDIZATION IS THE BASIS FOR EFFICIENT AND ECONOMICAL PRODUCTION. WITH R B YOU GET TE ACCEPTED STANDARD OF THE SHEET METAL INDUSTRY—IN STANDARD DESIGN FEATURES THAT SAVE IN ENGINEERING, DIE CONSTRUCTION AND OPERATION.

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THE RIGHT PRESS FOR THE RIGHT JOB

Editor's Note: The Fourth Spring Technical Meeting of the PRESSED METAL INSTITUTE held in Cleveland last March included six 2½ hour panel discussions. From a stenographic transcription we are reporting on the following pages one panel discussion held under the subject of: "The Right Press For The Right Job."

The discussion moderator was Raymond Peterson, President, Peterson Engineering Company, Toledo, Ohio. The members of the panel were: W. B. Saul, Vice Pres., Production and Engineering, L. & J. Press Corp., Elkhart, Indiana; Norman Dunlap, Director of Sales, Minster Machine Company, Minster, Ohio; C. F. Sherman, General Sales Manager, Henry & Wright Division of Emhart Mfg. Co., Hartford, Connecticut; Melvin D. Verson, Executive Assistant, Verson Allsteel Press Company, Chicago, Illinois; Gordon Sommer, Chief Engineer, Clearing Machine Corp., Hamilton, Ohio; John E. Bush, Sales Engineer, Elmes Engineering Division, American Steel Foundries, Cincinnati, Ohio; and H. B. Morse, Sales Engineer, E. W. Bliss Company, Canton, Ohio.

The several talks were followed by an informal question and answer session.

We wish to express appreciation for the courtesy extended by the PRESSED METAL INSTITUTE in granting permission to print the discussions and questions and answers from the transcription of the proceedings. E.W.P.

The Factors to be considered when Purchasing a Gap Frame Press, and the Advantages of Inclining Presses.

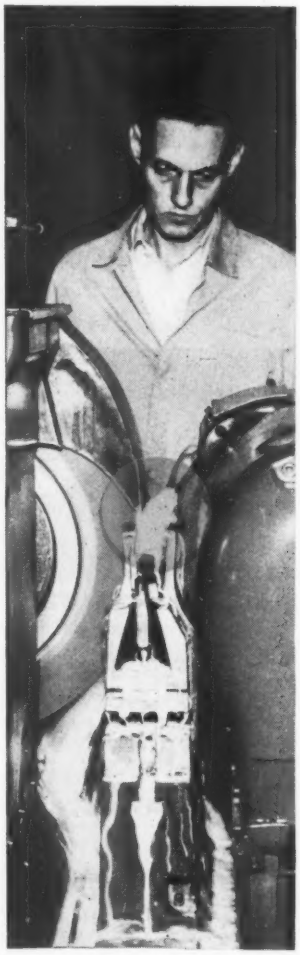
(From the presentation made by W. B. Saul, Vice Pres., Production and Engineering, L. & J. Press Corporation, Elkhart, Indiana.)

The well directed purchase of a gap frame press, needs the consideration of several factors. Usually the first consideration to be given is that of work dimension. The dimension in inches is a concrete and factual thing that everybody gets a pretty good grasp of, being the required space in inches that must be provided for the die to fit into the press. This factor can seldom be avoided and usually gets first consideration, although there have been cases when that was overlooked for a while.

Then there is the dimension in tonnage, which is just as concrete a factor as anything that occurs in inches, but it is much more readily overlooked, and therefore, most frequently left out of consideration.

The next thing in purchasing a press would be the work requirements. That is, the anticipated output.

The accuracy tonnage ratio is somewhat lower in the gap frame press than in the straightside or other types of construction. That is of necessity not a fault of the press. It is just the nature of the beast, because one side can't be held quite as rigidly as the other. In figuring a press for accurate operation with fine complicated dies, a much lower tonnage accuracy ratio should be used than in a press of another type. That is,



SOMETHING NEW IN HIS EXPERIENCE. It takes a lot of proof to convince grinding machine operators that one vitrified bond can be so much more efficient than another. Yet the new Norton G Bond has already made plenty of friends in plants throughout the country. How about getting your own shopmen's reactions to the "Touch of Gold"?

Add the "TOUCH OF GOLD" to your grinding with the NEW Norton G BOND

Here, ready to bring you immediate benefits, is the most radically improved vitrified bond ever produced — the new Norton G Bond!

Norton ALUNDUM* wheels made with the new G Bond cut freer, cooler and faster, hold corners better, are better for form grinding and produce a smoother finish. They do more work per wheel because they dress easier and produce more pieces per dressing.

Every one of these advantages means time and money saved — the real "Touch of Gold" that adds more value to your products and increases your profits by reducing your grinding costs.

YOUR NORTON DISTRIBUTOR can supply you promptly with ALUNDUM wheels in the new G Bond. Ask him about arranging a try-out in your plant. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

How the new G bond assures more efficient cutting action

ALUNDUM abrasive grains are held by the G Bond until they've done the most effective cutting job, then released to make way for new grains with fresh, sharp cutting edges. It's this unique ability of the new bond to hold the grains *just long enough* that keeps the wheel's grinding surface at constant peak efficiency.

if a 20-ton job is to be done which is very fussy and has an intricate die, the only type of gap press that would be logical then would be maybe one of 30 or 40 tons, so that the deflection could be held down as near zero as possible. However, for the vast majority of stamping, the open-back mechanical press is the regular work-horse.

Another thing that has to be considered is whether a press is being bought for a certain run or whether it is something that is going to be just a general and all-purpose press, to accommodate a number of changes in dies. Usually a production stamping shop or press room includes in the initial equipment one or more open-back mechanical presses. In many instances, a few of these versatile machines constituted the entire initial equipment.

Usually this press is referred to as the OBI, as a commonplace term. Due to lack of experience or lack of large equipment, and frequently thereafter from the force of habit, expediency or even expendability, the gap frame inclinable press is the most widely used and widely misused of all presses.

In this type of press, as is true with all others, if the job justifies the use of a certain size press and a smaller size is bought, the chances are that the difference that is saved in press size will be paid out in the cost of parts or in down time, and oftentimes it will be paid off more than once or several times over. So whether or not the right size press is bought for the job, it will cost the difference in the long run, to keep the job running.

There also should be considered the work facility and the output. This requires study of the production schedules and the speed of the handling of parts, the operating speeds of the presses.

As far as the facilities and the ease of handling parts; the gap frame press can't be beat.

Likewise, the open-back inclinable press is probably less frequently used on special purpose jobs. Some shops will set it up and run the inclinable press for months on a certain job, however that is the exception to the rule. The main use seems to be in the jobbing and stamping industry, where there are frequent changes of dies, frequent variations in work and quick changes.

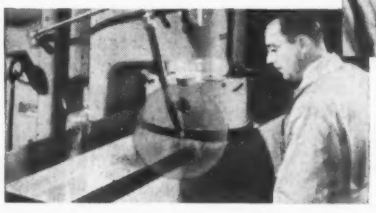
The first and most important advantage, is getting the work out of the dies. It falls out the back into the tote box, or onto the conveyor. There are other cases where the work is dropped into a stacking device or something of the sort, that makes handling still easier.

In other words, it just lends itself all the way along to getting the work out and taking the work up from there on.

Loading is sometimes assisted with an inclined press, such as the strip-feed presses, where the stack of strip stock is laid into the rack, which leans against the back, and it only requires one support to keep in position. The same thing is true for hand-feeding dies when there is an automatic gauge on the die. The operator leans the sheet against the back edge of the press incline and shoves it in one direction into the die and usually as fast as the press will strip.

Make these 3 easy tests...

LOOK! You can see the difference in the spark stream of a Norton G Bond ALUNDUM wheel. No intermittent sparking, but a continuous, even stream that means uniform cutting action.



LISTEN! Norton G Bond wheels grind with the pleasant, steady swish-h-h of free, easy cutting. You hear no harsh grinding noise.

EXAMINE! On precision jobs, especially, you'll get the results you want faster. And every job you do with G Bond wheels will benefit by their new, unique cutting action.

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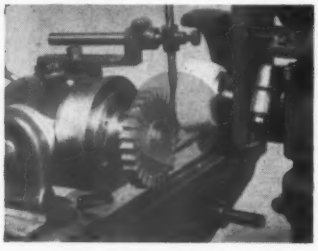

G BOND WHEELS HANDLE MANY JOBS, big and little, easy or difficult. You'll find them particularly valuable for such types of grinding as cylindrical, centerless, surface, internal, gear, tool and cutter, form and thread grinding and saw gumming.

W-1481

Slugs are usually put through the bolster wherever possible. If they are not, that even assists by dropping the slugs through the slot which may be considered a safety factor, although it doesn't pay to take that for granted, because slugs have a way of stacking, even on an inclined press.

There is also the relatively minor advantage of inclining a press, that is, the operator has the oil and lubricant dripping away from him, rather than toward him, in case it has to be plugged.

Most of these factors which are mentioned are not peculiar to gap frame presses — that is, getting the right tonnage and so on — but since the open-back, inclinable press furnishes much of the proving ground for the industry in actual production, it also provides much of the experience on which general press selection is based; therefore, the open-back, inclinable press serves a good purpose for any concern that is getting its feet on the ground with presses and getting a little more familiar with them. They really point the way, and they point the way largely in the industry because of their general utility.

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The Factors to be Considered When Purchasing Press Brakes.

(From the presentation made by Mr. Melvin D. Verson, Executive Assistant, Verson Allsteel Press Company, Chicago, Ill.)

When buying a press brake two things have to be considered. First, press brakes are built two ways — mechanical and hydraulic. The first thing to be decided is which type of machine is wanted. Most PMI plants, small or large, have mechanical press brakes, and for the type of work that is done in the average PMI shop that is all that is needed. Briefly the hydraulic press brake, because it is something new, has not been on the market for a long period of time.

The hydraulic press brake is intended primarily to serve in a heavy fabricating shop, where large plates are bent to any angle, conical shapes formed and tonnage requirements very heavy.

Equivalent tonnage per tonnage, a hydraulic brake will be cheaper than the mechanical in the heavier tonnages, but it is not a machine than can do the average run of job shop work.

The mechanical press brakes are built in almost any tonnage, from 15 tons on up. They are built in many, many ways. The average press brake is a machine intended primarily for bending metal.

Press brakes can also be used for punching, forming, drawing and large blanking. There is an adaptation of a press brake available which permits heavy tonnages, considerable bed areas, and not ungenerous stroke lengths, at a very moderate price, and it can be used for almost anything except deep drawing. There are also modifications of press brakes available which turn them into good-sized presses. There are press brakes in operation today that are equipped with wide beds and wide rams, cushions, electric controls, pneumatic clutches, which turn a press brake

into a very versatile, large-bed mechanical gap press, and still retain the advantages of a standard press brake when being used for just the straight bending work.

Some of the things to be considered when purchasing a press brake are as follows:

First, the type of clutch. Most press brakes on the market today are equipped with a foot-treadle-operated friction clutch. Available for these foot-treadle-operated friction clutches are auxiliary electrical controls, which have become quite popular in the industry. Larger size press brakes are built with straight pneumatic clutches.

Another point to consider when purchasing a press brake is the depth of section, in the bed and ram, because the depth of section and not the thickness of the plate primarily determines the amount of deflection. The more deflection which occurs, the poorer the piece part which will be produced by the machine.

Another item to consider is the lubrication system that is on the machine you buy. Press builders very strongly advocate automatic lubrication systems on presses. They are not only good for the manufacturers standpoint that they will have less trouble if a machine is properly lubricated at regular intervals, but they are also good for the owner, because if he has a floor-level system, where he has a bunch of points that a man has to catch with a grease gun, he has to depend on the human element, and as you know, that human element is none too good at times.

Another thing to consider is the gibbing on a press brake. The press brake gibbing is a point of discussion between press brake manufacturers. Some manufacturers use different types of gibbing.

Another thing to consider is the ease and accessibility of removable parts for maintenance purposes.

Still another item to consider is the adjustment of the ram, not in a straight up-and-down plane, but whether or not that ram can be tilted in order to perform fade-out work, cone bending.

Another item to consider, again, is the type of gearing. Is the machine single-driven, twin-driven, single-geared or double-geared?

All of these items lend themselves to giving the owner a better machine, a machine that will do his job at less initial cost and at less upkeep and with less down time.

FOR YOUR FUTURE
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SAVINGS BONDS

The Factors to be Considered When Purchasing Dieing Machines.

(From the presentation made by Mr. C. F. Sherman, General Sales Manager, Henry & Wright Division of Emhart Manufacturing Company, Hartford, Connecticut).

The three major factors which determine the cost of stampings are material, labor and die life. Material requirements are generally the same regardless of the type of press used. There-

self releasing
precision expanding mandrels

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• ERICKSON PRECISION EXPANDING MANDRELS provide the ideal means of gripping on interior surfaces. With them, close tolerance machining or checking operations can be accomplished with exceptional speed.

The mandrel sleeve, alternately slotted from each end, expands and grips along its entire length . . . accommodates variations over 1/32" range.

A single mandrel shank is usable with an entire series of sleeves and can handle an enormous variety of work.

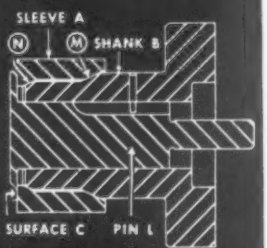
Besides the illustrated standard models, multiple sleeve and other special designs can be adapted to meet specific job requirements.

Sleeves can be machined to fit splines, undercuts, threads, and other internal contours.

A-7510

the inside story...

Sleeve "A" is automatically lined up concentrically with the axis of shank "B" by the sleeve's cam surfaces "M" and "N". These mate with the cam surfaces of the shank to within .0001". Sleeve "A" is open slotted at both ends. When pin "L" is drawn back against surface "C", sleeve "A" expands equally over its entire length. Release of this force instantly relieves the mandrel's grip. Some models use locknuts to expand the sleeve instead of the drawpin in the diagramed design.



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fore, if stamping costs are to be reduced, it is essential in selecting the dieing machine that the specifications of the equipment be such as to give the maximum tool life and the minimum labor cost.

If stamping quantities are not sufficient to require more than one dieing machine, then, of course, the capacity of that machine must be great enough to handle the heaviest job and be equipped with a stroke long enough for the longest draw or form. When the stamping quantities require two or more dieing machines, the stampings can be divided into two groups — flat stampings in one group and the drawn or formed stampings in the other. This will allow the dieing machine used for the blanking operations to be equipped with the shortest practical stroke and permit higher operating speeds as well as provide longer die life due to the lower impact load on the punches. For electrical laminations, a stroke of between 1 inch and 1½ inches would be recommended.

While it is sometimes necessary to grind shear or step the punches to reduce the load in order to use a dieing machine already on hand, the die life is decreased as the longer portion of the punch enters the material a greater amount and more metal must be removed to resharpen. Further, there is always the danger that the correct shear may not be maintained in resharpening, resulting in pressures in excess of the rated dieing machine capacity and consequently the production of less stampings between grinds. Therefore, when purchasing a new dieing machine, the capacity should not only be sufficient to handle the heaviest job without shear on punches but also provide for an additional 10 percent for the increased pressure as the dies become dull. If the die is of the spring stripper type, an additional 15 percent should be added to the calculated pressure to provide a suitable contingency.

On progressive dies containing drawing stations, the blankholder load should be included in the total load calculations.

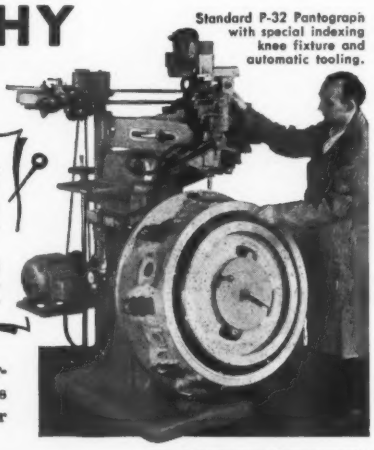
Progressive dies which include drawing stations for straight shells will require a stroke at least equal to four times the length of shell or drawn portion. This is due to the fact that the feeding cycle of our standard roll feed extends over slightly more than 180 degrees. Shorter strokes are required for tapered or hemispherical shells. The crankplate which drives the feed mechanism is angularly adjustable to permit varying the beginning and end of the feed cycle where the nature of the work requires.

The total load, dimensions and the type of stamping will determine whether the dieing machine should be of the flywheel or geared type.

After the capacity of the dieing machine has been determined, the catalog dimensions of the die bed, bed opening, and shut height should be checked against the dies to be used. The length of bed and upper crosshead, also the size and shape of the bed opening, can be readily altered to suit the die. Guide rods can be lengthened or shortened to vary the shut height where necessary.

PANTOGRAPHY

Solves Complex Profiling Problems with Automatic Cutting Cycle

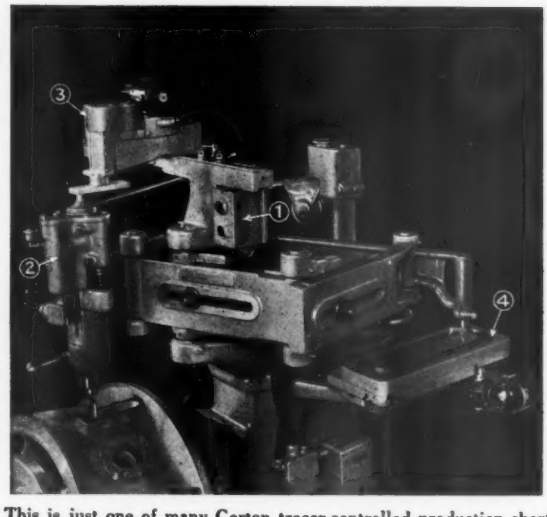


Standard P-32 Pantograph with special indexing knee fixture and automatic tooling.

PROBLEM: Profiling eight ports in outside portion of aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is parabolic.

SOLUTION: Gorton P-32 Pantograph profiles all eight ports at the rate of 2.3 minutes per port. Cutting cycle is automatic; indexing is manual.

This is truly a power-driven tracer-control job that would require hours if done by a combination of other methods.



Here's How It Works

1. Complete cutting cycle begins when "start" button is pressed.
2. Air cylinder automatically feeds cutter down to cutting position. Cam-operated spindle down feed then takes over. Upon completion of cut and after spindle retracts, this air cylinder further retracts cutter for clearance.
3. Speed of spindle down feed during cutting is controlled by cam through a Variac.
4. Motorized chain-driven master starts automatically when "start" button is pressed.

This is just one of many Gorton tracer-controlled production short-cuts which might save you time and money. For complete information, clip and mail the coupon now.

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Although pneumatic cushions can be installed in the bed for the production of drawn or formed stampings by the progressive method, it is preferred to mount the cushions on the top of the upper crosshead because of the accessibility. This type of mounting can be used in place of springs on spring stripper type dies for laminations and other flat work. The advantages are: the elimination of spring breakage or set, stronger stripper construction, and a lower stripper load.

Although the upper base provides ample room for the use of stacking chutes for work normally produced, additional space can be provided in special cases. These chutes are readily attached to the bottom of the bolster by screws extending through the bolster into the flange of the chute.

Double roll feed is furnished as standard equipment with the dieing machine as the roll feed has been found to be the most satisfactory universal feed for progressive die operations. Special feeds can be supplied where the nature of work requires. These include transfer, grip, magazine, hopper and dial type units.

The upper feed rolls are lifted by a cam on the crankshaft to permit free piloting or registration of the material. The standard cam is designed so that the roll drops and contacts the material at the bottom of the stroke. For aluminum and other soft materials, a special cam can be furnished with a slower drop to avoid marking the material at high speeds.

When producing drawn or formed parts in progressive dies, better feeding conditions are often obtained when the inbound feed unit is placed at the die level and the outbound unit at a heighth of one-half the shell length above the die. This can be readily accomplished with the drive construction used in the standard dieing machine roll feed.

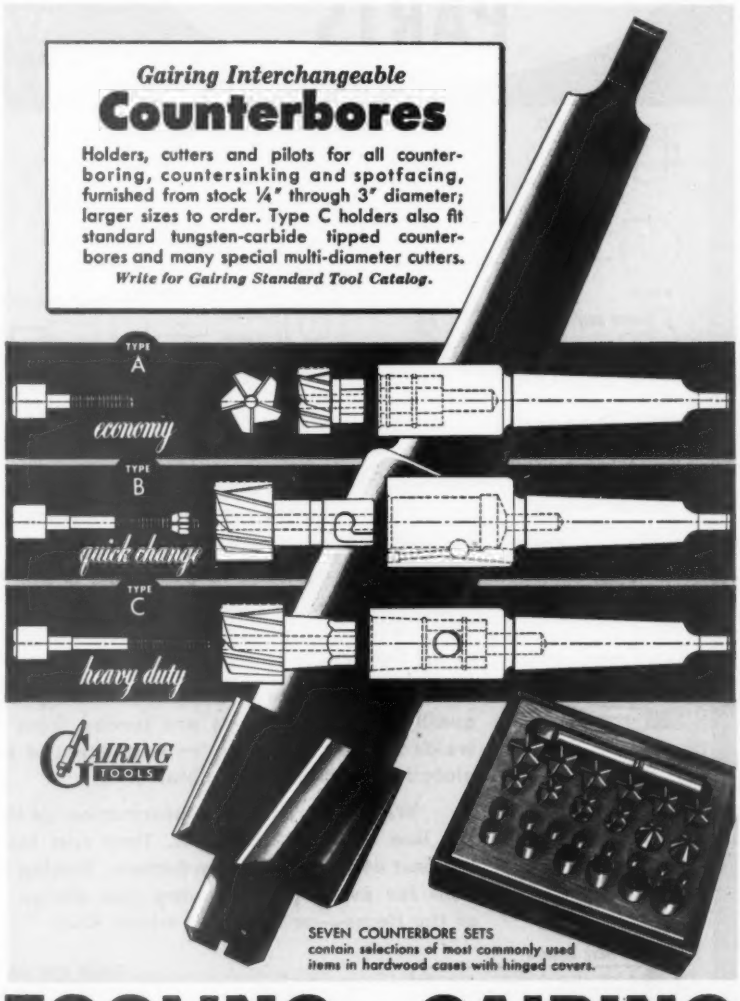
Pneumatic lift can be supplied to eliminate the manual lifting of the upper rolls when inserting a new coil or removing an old coil from the feed unit.

Scrap cutter attachment is furnished as standard equipment and operates at every stroke. Various types of controls can be supplied to cut the scrap or processed material into any desired length after it leaves the outbound feed.

A variable speed drive is recommended for the dieing machine so that each job may be produced at the maximum practical speed. This is an important feature when the same dieing machine is used for both flat and drawn stampings. The drive can be either mechanical or all-electric, as the customer prefers.

In producing eyelets in multiples by the progressive die method, the operating speed is governed to some extent by the speed at which the heat generated at the drawing and redrawing station can be dissipated. Higher speeds are being obtained on dieing machines which have been supplied with a barrier or wall cast integral with the die bed and mounting the machine in a welded steel tank. The latter is equipped with a motor-driven pump to flood the die with a drawing compound to dissipate the heat more rapidly, thereby maintain-

. . . Continued on page 106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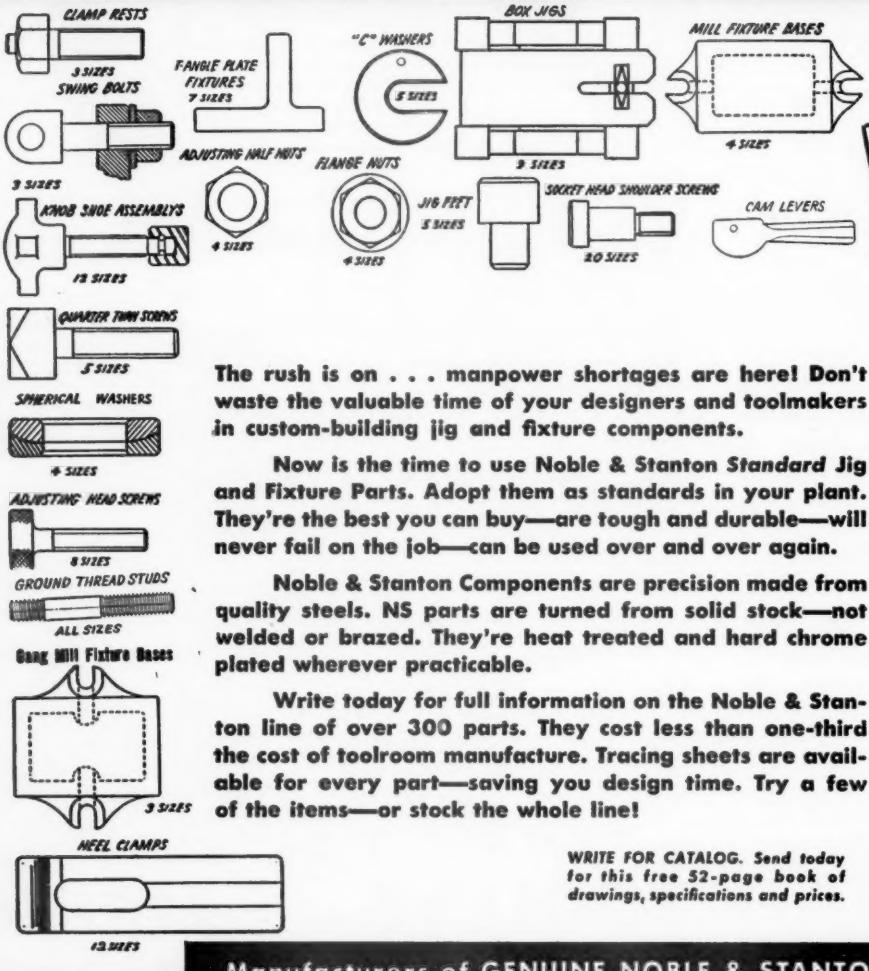

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13	30	69	89	106	116.6	132	145C	152A	158A	164A	170C	175B	179C	185C	
14	31	70	90	107	116.7	133	146A	152B	158B	164B	170D	175C	180A	186A	
15	32	71	91	108	116.9	134	146B	152C	158C	164C	170E	175D	180B	186B	
16	33	72	92	109	116.10	135	146C	152D	158D	164D	171A	176A	180C	187A	
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5	22	40	79	98	115	122	140A	147B	154D	160B	167A	174A	178A	182	189
6	23	59	80	99	116A	123	140B	148A	155A	160C	167B	174B	178B	183A	190
7	24	61	81	100	116B	124	141	148B	155B	160D	168A	174C	178C	183B	
8	25	63	82	101	116.1	125	143A	148C	155C	161A	168B	174D	178D	183C	
9	26	64	85	102	116.2	126	143B	150A	155D	161B	168C	174E	178E	184A	
10	27	65	86	103	116.3	127	143C	150B	156A	162A	169	174F	178F	184B	
11	28	67	87	104	116.4	129	145A	150C	156B	162B	170A	174G	179A	185A	
12	29	68	88	105	116.5	131	145B	150D	156C	163	170B	175A	179B	185B	
13	30	69	89	106	116.6	132	145C	152A	158A	164A	170C	175B	179C	185C	
14	31	70	90	107	116.7	133	146A	152B	158B	164B	170D	175C	180A	186A	
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A3	A17	A31	A45	B8	B22	B36	B50	B64	B78	B92	B106	B120	B134	C9
A4	A18	A32	A46	B9	B23	B37	B51	B65	B79	B93	B107	B121	B135	D1
A5	A19	A33	A47	B10	B24	B38	B52	B66	B80	B94	B108	B122	B136	D2
A6	A20	A34	A48	B11	B25	B39	B53	B67	B81	B95	B109	B123	B137	D3
A7	A21	A35	A49	B12	B26	B40	B54	B68	B82	B96	B110	B124	B138	D4
A8	A22	A36	A50	B13	B27	B41	B55	B69	B83	B97	B111	B125	B139	D5
A9	A23	A37	A51	B14	B28	B42	B56	B70	B84	B98	B112	B126	C1	D6
A10	A24	A38	B1	B15	B29	B43	B57	B71	B85	B99	B113	B127	C2	D7
A11	A25	A39	B2	B16	B30	B44	B58	B72	B86	B100	B114	B128	C3	D8
A12	A26	A40	B3	B17	B31	B45	B59	B73	B87	B101	B115	B129	C4	D9
A13	A27	A41	B4	B18	B32	B46	B60	B74	B88	B102	B116	B130	C5	D10
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These better tool bits, packed in the famous blue-and-gold boxes, are immediately available in standard sizes from stocks located at 28 convenient points throughout the country.

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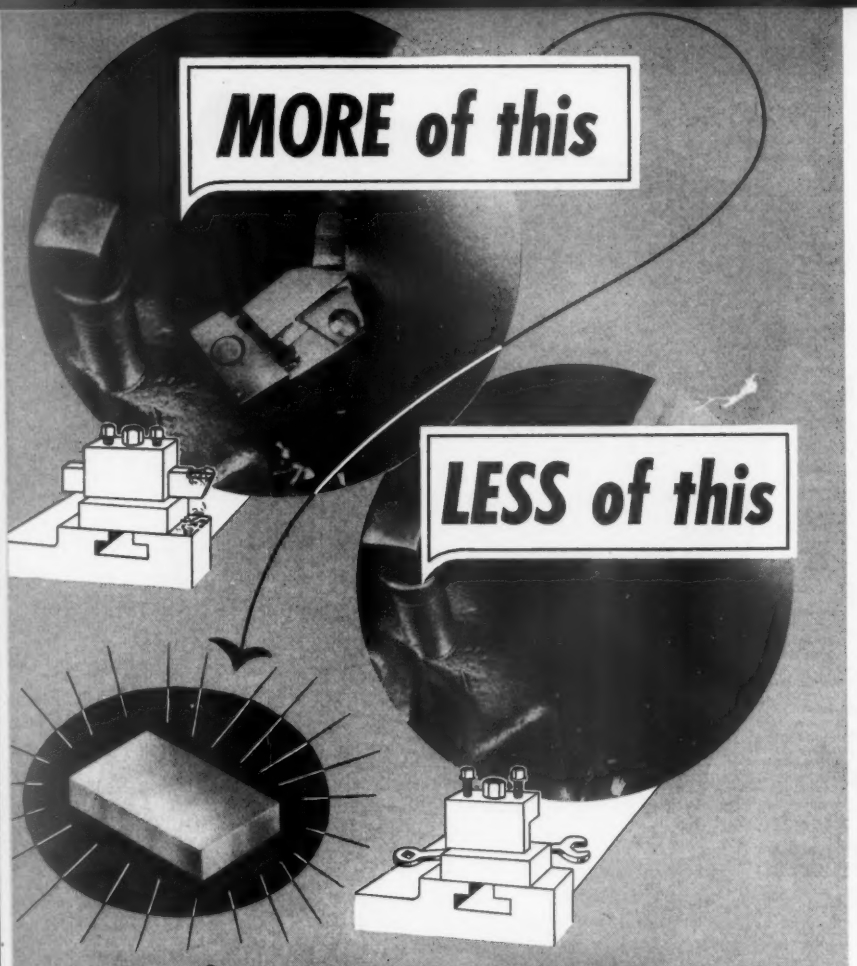
SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS



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Shut down of a machine for tool change does not shut off operating expense. Production stops, but costs run on.

There's a way to minimize this non-productive time . . . Kennametal tools seldom need replacement — hours on the machine, minutes being reground.

Kennametal is "different" — ingredients, compositions, processing. The resultant distinctive characteristics are utilized to a maximum degree in novel tool designs — especially the clamped-on technique — in which we pioneered.

How Kennametal reduces Lost-but-Paid-for-Hours is disclosed by case studies in periodically-issued Performance Reports, and can be demonstrated in your own plant. Such information and help is yours for the asking. Kennametal Inc., Latrobe, Pa.

KENNAMETAL
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY

Snagging Grinder Replaces Hand Chippers

One of America's leading automobile manufacturers has achieved big man-hour savings in the processing of rough cylinder head castings by instituting a modern grinding operation. The problem is to remove the rough metal fins protruding from the sides of the cast iron head as they come from the moulds and to maintain the necessary rate of production—currently 1600 castings a day.

Photos courtesy Bealy-Wells Corporation

Fig. 1. Grinder at work on cylinder heads. Notice how castings are conveyed directly to power driven feeding fixture. See how shoes hold down casting as lug on feed chain pushes it through grinder.

Before installation of the grinder that is now used for snagging, hand chippers were employed to remove the fins from the castings. This was a tedious process, but it was a production policy to meet the required cylinder head quota daily no matter how many men had to be put on the job. Therefore, much manpower was tied up in this one operation.

Now, only one man and a double spindle dry grinder are necessary to keep up with production line demands, Figure 1. The set-up works like this: When the moulds are shaken out, the hot castings are brought to the grinder on a

. . . Continued on page 90

BIG CYLINDERS
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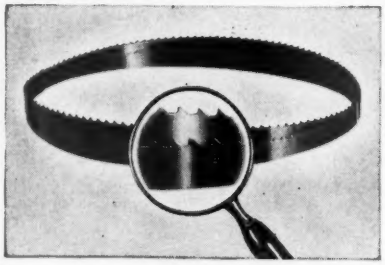

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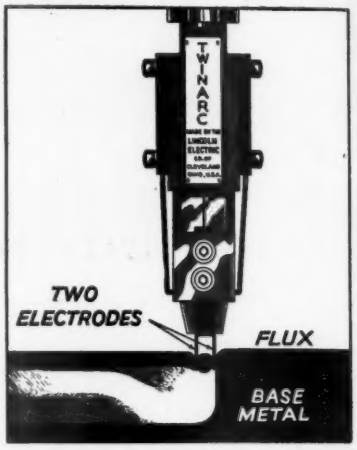
Twinarc Welding

A new development in the application of hidden arc or submerged arc welding, increases the speed of automatic welding



Photos courtesy Lincoln Electric Company

from 50 per cent up. Twinarc welding, as the development is called, employs two small electrodes in place of a single larger electrode. The two electrodes are fed simultaneously through a single head and a single jaw. Both electrodes deposit metal in the weld crater. The higher currents possible with two electrodes increase the rate of metal deposition, amount of penetration and, consequently, welding speeds.

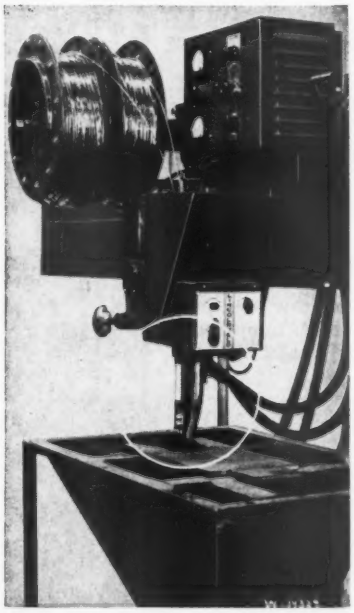
Twinarc welding is recommended for use on butt or fillet welds in ¼" or thicker plate where the application is normal for automatic hidden or submerged arc welding. Typical of the speeds possible is that used in making a ¾" fillet weld, 15" per minute at 1500 amperes.

A special electrode jaw, wire feed rolls and wire guides adapt any standard Lincolnweld head for using two electrodes. The standard single head controls are used as well as the standard DC welding current generators. Currents up to 1500 amperes can be used with Twinarc welding for which two generators may be paralleled or a single 1500 ampere unit may be used. The two-wire head will feed electrodes in 5/64", 3/32" and ⅛"

diameter sizes. The two electrodes are fed down into the Twinarc jaw where the welding current is conducted into each electrode from the same contact block. The electrodes are pressed against each side of this contact block which determines the electrode spacing. This spacing is normally ½" but can be adjusted where necessary. Both electrodes are regulated equally by the common arc voltage control. The welding current from the common welding generator automatically divides between them.

The electrodes are normally in line along the seam but may be skewed ⅛" so that they are across the seam. This produces a wider bead. If a still wider bead is desired or if burn-through is a problem, the electrodes can be run side by side. Side by side operation is recommended for poor fit-up. These electrode adjustments are the only extra adjustments needed other than those normally required for automatic welding.

In addition to increasing the speed of automatic welding, Twinarc welding also facilitates welding on rusty or dirty plate,

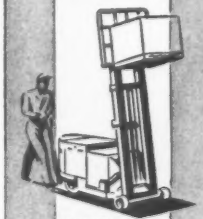


producing high quality welds where normal single arc technique would result in pin holes. The two arcs and resulting larger crater allow time for gases in the crater to be expelled.

Hedrich-Blessing Photograph, courtesy of the EDWARD HINES LUMBER CO.

CLARK Electric Fork Trucks

CLARK Attachments



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No matter what your handling requirements are—there's a CLARK machine to do the job. Electric or gas powered fork trucks, POWRWORKER hand trucks, industrial towing tractors—they all give you quality-value for your money. That's why industry buys more CLARKS than any other make of truck. When you're in the market for materials-handling equipment, talk to your local CLARK dealer first. Most people do!

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Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

. . . Snagging Grinder, from page 86

gravity conveyor. The grinder operator breaks off larger pieces of excess metal with a few hammer blows and rolls the castings from the conveyor onto a power driven feeding fixture on the grinder. The heads are then automatically fed through the grinder, and the fins, 3/16 to 5/16 inches thick, are snagged off at a single pass, producing clean, smooth, ready-to-machine castings. By doing the job this way, the manufacturer makes considerable savings in labor, and gets better, more satisfactory results as well.

The power driven feeding fixture as used for snagging cylinder heads is equipped with special guide plates and spring-loaded shoes that hold down the castings as they pass through the machine. The heads are moved by lugs properly spaced on a continuous chain that is motor driven through a worm and worm gear reducer.

The grinder uses two 30″ x 2″ x 6″ titan steelbac abrasive discs of resinoid-bonded silicon carbide abrasive grain. They are driven through multiple vee-belt transmissions by two 25 HP, totally enclosed, fan cooled, ball bearing motors operating on 220 V, 60 cycle AC. The grinder is equipped with a swinging arm truing device with ball bearing cutters for wheel dressing. Safety features include belt guards and a special welded steel exhaust hood.

With changes of fixturing, the grinder can be adapted to a wide variety of grinding operations to speed and simplify many manufacturing processes, Figure 2.

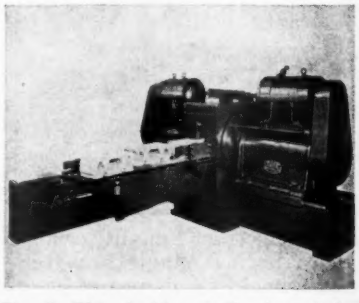

Fig. 2. This double spindle dry grinder is fixtured for smooth-surfacing tops and bottom of concrete blocks. Power feeding again speeds and simplifies the operation.

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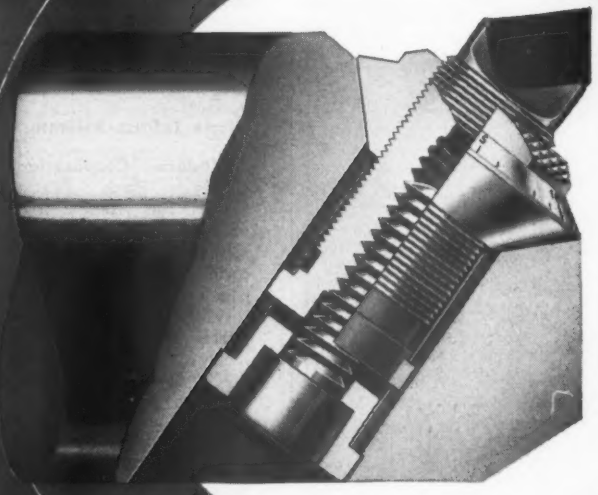

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PUBLICATION

The Super Precision Tool Room Equipment designed and manufactured by the Netherlands Arsenal, Hamburg, Holland, is fully described in an illustrated folder published by Amlintool, Inc., 17 Beckley Ave., Stamford, Conn. Included in the literature are tool room and cutter grinders, tool maker lathes and turret lathes.
Circle Inform-A-Gram No. B1.

What Is Electric Co-6 High Speed Steel? It is the double six type to which 9.00 per cent colbalt has been added to increase the red hardness and permit a retention of greater cutting hardness at elevated temperatures. Other information is available in a new booklet on the product from the Latrobe Steel Co., Latrobe, Pa.
Circle Inform-A-Gram No. B2.

Torit Dust Collectors are available in both cabinet and cyclone types, in sizes ranging up to 5 h. p.

Note how compactly this Torit 19 FB Dust Separator fits into unused space at the back of a Do-All band saw. It is completely out of the way yet so close to the work that piping, and attendant loss, is minimized. The operator reports a dust collecting efficiency of 99%, with plastic and hard rubber as well as metals.

Torit Dust Collectors are compactly designed, self-contained units. There are models for every standard task and special adaptations can be quickly created. They can fit into your present production lines without a *ripple* and will make *smooth sailing* of your dust problems. Write for details.

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Creative Product Development, an attractive eight-page booklet from Designers for Industry, Inc., 2915 Detroit Ave., Cleveland 13, Ohio answers questions on industrial product developments by an independent engineering concern for organizations requiring outside assistance.
Circle Inform-A-Gram No. B3.

Rotary Joints, Hydraulic Relief Valves and Check Valves are important to industry because they are compact, dependable and have few operating parts. Brochures on these products are available from Anco Inc., 1 Baker St., Providence 5, R. I.
Circle Inform-A-Gram No. B4.

Modern Corporation, Box 68, College Park Station, Detroit, Mich., has issued a new catalog of standard counterbores, countersinks and core drills. Designed for quick reference, the booklet supplies complete engineering and buying data.
Circle Inform-A-Gram No. B5.

Complicated Brazing Problems and selection of proper preforms are discussed in a technical bulletin recently produced for the brazing industry by Lucas-Milhaupt Engineering Co., Cudahy, Wis.
Circle Inform-A-Gram No. B6.

Vickers New Hydraulic (Oil) Cylinders bulletin brings up to date the specifications and engineering information on the firm's complete line of hydraulic cylinders for industrial machinery. Write to Vickers Inc., 1450 Oakman Blvd., Detroit 32, Mich.
Circle Inform-A-Gram No. B7.

A Metal Hose Technical Data Book is now available from the Universal Metal Hose Co., 2133 South Kedzie Ave., Chicago 23, Ill. The brochure includes information on applications and temperature ranges of various types of metal and wire braided hose.
Circle Inform-A-Gram No. B8.

A Mechanical Pressure Gauge is described as a new tool for cutting cost in a sales and engineering brochure published by W. G. Dillon & Co., Box 3008, 14620 Keswick St., Los Angeles, Calif. This compact instrument can be used alone or incorporated directly in special testing devices and is designed to measure mechanical pressures or compressive loads in limited space, according to the company bulletin.
Circle Inform-A-Gram No. B9.

PREVIEWS

Circle postage-free Inform-A-Gram Key Number for your request

Pittsburgh Tool Steel Wire Co., Monaca, Pa., has described the qualities, diversity and usefulness of its cold finished steel products in a bright little booklet. Tables and working data of value to fine quality steel users are included.
Circle Inform-A-Gram No. B10.

The Small Capital Investment Press is the subject matter of a recent informative folder published by Di Machine Corp., 2711 W. Irving Park Rd., Chicago 18, Ill. The booklet deals with 5, 8 and 12-ton Diebel Di-Master stamping presses.
Circle Inform-A-Gram No. B11.

Di-Profiler Is A Power Driven Tool that keeps the "feel" of hand filing at fifty times the speed. Complete information on kit and accessories available from Nord International Corp., P. O. Box N140, Denville, N. J.
Circle Inform-A-Gram No. B12.

"Putting Precision to Work" is a four-page illustrated booklet giving full particulars of the 2E Electrolimit Jig Borer by Pratt & Whitney, West Hartford 1, Conn. In the literature operating procedure and specifications are given.
Circle Inform-A-Gram No. B13.

The Nibblex Sheet Metal Cutting Nibbler is fully described in literature now available upon request from the Nord International Corp., P. O. Box 44-N140, Denville, N. J. Included in the pamphlet is data on how Nibblex can be used in place of a shear or with any electric or hand drill receiving a ¼ inch shank.
Circle Inform-A-Gram No. B14.

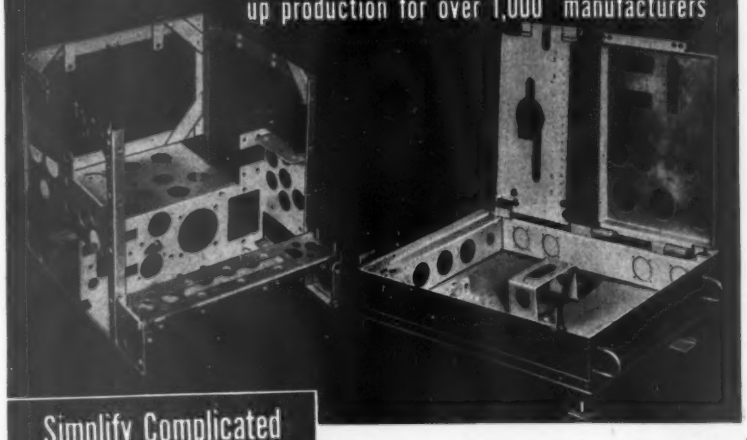
The Green Instrument Co., 385 Putnam Ave., Cambridge 39, Mass., has a new catalog out on its 15 styles of letters and numerals in master type set. Available upon request, this bulletin provides a ready reference for the many different styles of lettering designs required in engraving with a pantagraph.
Circle Inform-A-Gram No. B15.

Koebel Handexer cuts wheel dressing and diamond tool costs by providing the grinder operator with a simple, visible and accurate means of keeping his diamond sharp. Circulars covering the new Handexer for cylindrical grinders is available from Koebel Diamond Tool Co., 9456 Grinnell Ave., Detroit 13, Mich.
Circle Inform-A-Gram No. B16.

Advantages of Press Type Brakes are painstakingly described and illustrated in a new bulletin prepared by Cyril Bath Co., 6889 Machinery Ave., Cleveland, Ohio. Also included in the booklet is data on the Bath brake's interlocked electrical safety controls and complete specifications.
Circle Inform-A-Gram No. B17.

Modern Press Engineering and Correct Die Design are two factors emphasized in a 4-page illustrated booklet being offered by Di Machine Corp., 2711 W. Irving Park Rd., Chicago, Ill. The brochure features data and specifications on the Diebel 40-ton Dimatic high production press.
Circle Inform-A-Gram No. B18.

Whistler Adjustable and Magnetic Perforating Dies are stepping up production for over 1,000 manufacturers



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For prices and application data on this modern way to speed production and cut unit costs, write for these illustrated Whistler catalogs.

For your convenience Whistler direct factory representatives are located in most principal cities. Their on-the-job application experience, combined with Whistler's 35 years experience in the manufacture of tools and dies, is available on request.

Booth 2024—National Metal Congress—Oct. 19 to 23, Cleveland

Features in the New Horton Chuck catalog include a visual reference index for quick location of chuck type wanted, sectionalization of each type together with corresponding jaws and parts, plus illustrations and dimensional drawings. Literature available from E. Horton & Son Co., Windsor Locks, Conn. Refer to Catalog No. E-100 when writing.
Circle Inform-A-Gram No. B19.

Replaceable Inserts and Die Cast Hard Steel Bodies help give the high chrome high carbon bushings by Revere Fisher Engineering Co., North Branch, Michigan their cost cutting and accurate qualities. Wear surface from .030" to .050" thick.
Circle Inform-A-Gram No. B20.

"On Target" is title of a colorful new brochure from the Lamson Corp., Syracuse 1, New York. Pictures and describes many unique and thought-provoking applications of the airtube conveyor system in today's industry. Want a tool crib at each machine?
Circle Inform-A-Gram No. B21.

Five Metal and Plastic Finishing Processes are described in a new bulletin from Tumb-L-Matic, Inc., 4510 Bullard Ave., New York 70, New York. Wet and dry processes for metal and plastic parts are all separately treated, together with a combination process for special materials and problems. Bulletin PC-52.
Circle Inform-A-Gram No. B22.

There is hardly anything in this world that some man cannot make a little worse and sell a little cheaper, and the people who consider price only are this man's lawful prey. JOHN RUSKIN

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*See "A special American Machinist report to the metal working industries" © 1950 by McGraw Hill Publishing Company. Quoted by permission.

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Extremely Useful Data on Gages and Gage Standards is packed into the new brochure by Standard Thread Gage Co., 26538 West Seven Mile Rd., Detroit 19, Michigan.
Circle Inform-A-Gram No. B23.

A Self-Gripping Heavy Duty Plier for general purpose work is described in a new 2 page bulletin from Palmer Welloct Tool Corp., Meadville, Pa. Special tooth design and leverage gives to 40% more gripping power.
Circle Inform-A-Gram No. B24.

Cemented Carbide Drilled, Tapped, Threaded and Broached to tolerances of .001". Die revisions, corrections machined in hardened state with no material change. Service by Arc Machining Inc., 732 N. Rochester Rd., Clawson, Michigan.
Circle Inform-A-Gram No. B25.

Quality Control and Magnification are tied together in latest handbook and catalog from Bausch & Lomb Optical Co., 797 Paul St., Rochester 2, N.Y. Explains how to select, operate and apply magnifying equipment in industry.
Circle Inform-A-Gram No. B26.

Compactness and Capacity are combined in "Burgmaster Tapper" by Burg Tool Mfg. Co., 3743 Durango Ave., Los Angeles 34, Calif. Range #10 — ½" NF. Rubber flex chuck, rugged construction. Data from maker.
Circle Inform-A-Gram No. B27.

Self-Cleaning Dust Collector # CH-3 is described in new bulletin 915 just issued by the Pangborn Corp., Hagerstown, Md. Six pages in two colors illustrate the features of the new unit, which uses the principle of reverse air flow for continuous cleaning of the cloth filters.
Circle Inform-A-Gram No. B28.

Dynamometer Bulletin D4 is now available from W. C. Dillon & Co., Inc., P.O. Box 3008, 14620 Keswick St., Van Nuys, California. This instrument is designed to measure traction, tension or weight in the field or wherever laboratory testing is not possible for any reasons. Catalog has all data, specifications, applications.
Circle Inform-A-Gram No. B29.

More Complete Data on Threads, Locknuts and Lockwashers; new spherical roller bearing width tolerance chart; and revised interchangeability chart and reorganization for easier reference mark the new bulletin 200-C on self-aligning spherical roller bearings by Tor-
Circle Inform-A-Gram No. B30.

Modern Sheet Metal Working has been greatly facilitated by the development of electric shears. The Mercury Supply Co., 410 Fairview, Elmhurst, Ill., tells of its electric hand shears in literature now available.
Circle Inform-A-Gram No. B31.

A New Type Low Pressure Pipe Lin Filter is recommended for the removal of dust, dirt, pipe scale, condensed oil and water vapor from compressed air lines in a four-page bulletin offered by Dollinger Corp., 11 Centre Park, Rochester 3, New York.
Circle Inform-A-Gram No. B32.

An Engineering Data Book has been prepared by Waterbury Tool Co., Waterbury 20, Conn. Included in the literature is information concerning the firm's line of heavy duty hydraulic pumps and motors.
Circle Inform-A-Gram No. B33.

Murchey Division of the Sheffield Corp., Dayton, Ohio, has a new attractive illustrated catalog on such products as die heads, taps, chasers and special threading tools, This booklet is available upon request.
Circle Inform-A-Gram No. B34.

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich., has available a new 16-page catalog covering its line of standard precision boring machines. This bulletin pictorially describes many proven features of the machine.
Circle Inform-A-Gram No. B35.

Reciprocating Gear Grinding Machines (Sheffield Model #140) are featured in a new attractive catalog published by the Sheffield Corp., Dayton 1, Ohio. Copies are available without charge.
Circle Inform-A-Gram No. B36.

Marvel Engineering Co., 625 W. Jackson Bldv., Chicago 6, Ill., manufacturer of sump and line type filters announces the availabilty of its new 12-page catalog on Marvel Sybclinal filters for hydraulic oils, coolants and lubricants.
Circle Inform-A-Gram No. B37.

Better Lathes For Better Profits is the title of a new booklet published by the South Bend Lathe Works, 425 East Madison St., South Bend 22, Ind. Featured in the bulletin is data on 10-inch lathes.
Circle Inform-A-Gram No. B38.

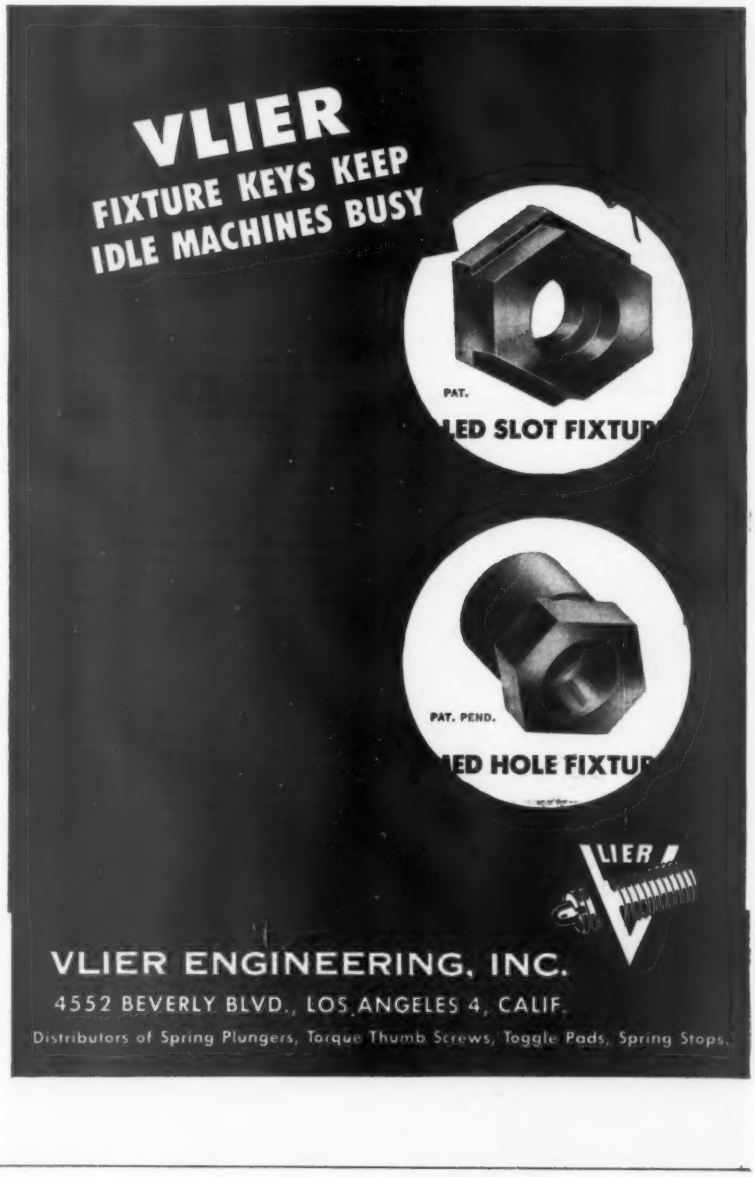
Socket Screw Division of Bristol Co., Waterbury, 20, Conn., has published a bulletin describing its line of hex socket and cap screws. Included in the circular is data on features and uses of cap screws along with price list and specifications.
Circle Inform-A-Gram No. B39.

Hydraulic Lift Trucks by Big Joe Manufacturing Co., 900 West Jackson Blvd., Chicago 7, Ill., are described and illustrated in a brochure put out by the firm. The booklet also carries dimensions and specifications of the various models.
Circle Inform-A-Gram No. B40.

"Desk Calculator," a handy six-page pocket-sized folder presents in easy-to-use form formulas, constants and conversion factors useful in basic engineering plus blast cleaning and dust control calculations. It is offered courtesy of Pangborn Corp., Hagerstown, Md.
Circle Inform-A-Gram No. B41.

The 1953 Lavallee & Ide Reamer Catalog, complete with net price list and specifications of the wide range of standard reamers, is now available. Write Lavallee & Ide, Inc., Chicopee, Mass.
Circle Inform-A-Gram No. B42.

New Tumbling Barrel performs many tasks and information concerning this improved unit is now available from the Abbott Ball Co., Railroad Place, Hartford, Conn. Features listed in the circular include precision speed controls, interchangeable parts, color dynamics and low operating costs.
Circle Inform-A-Gram No. B43.

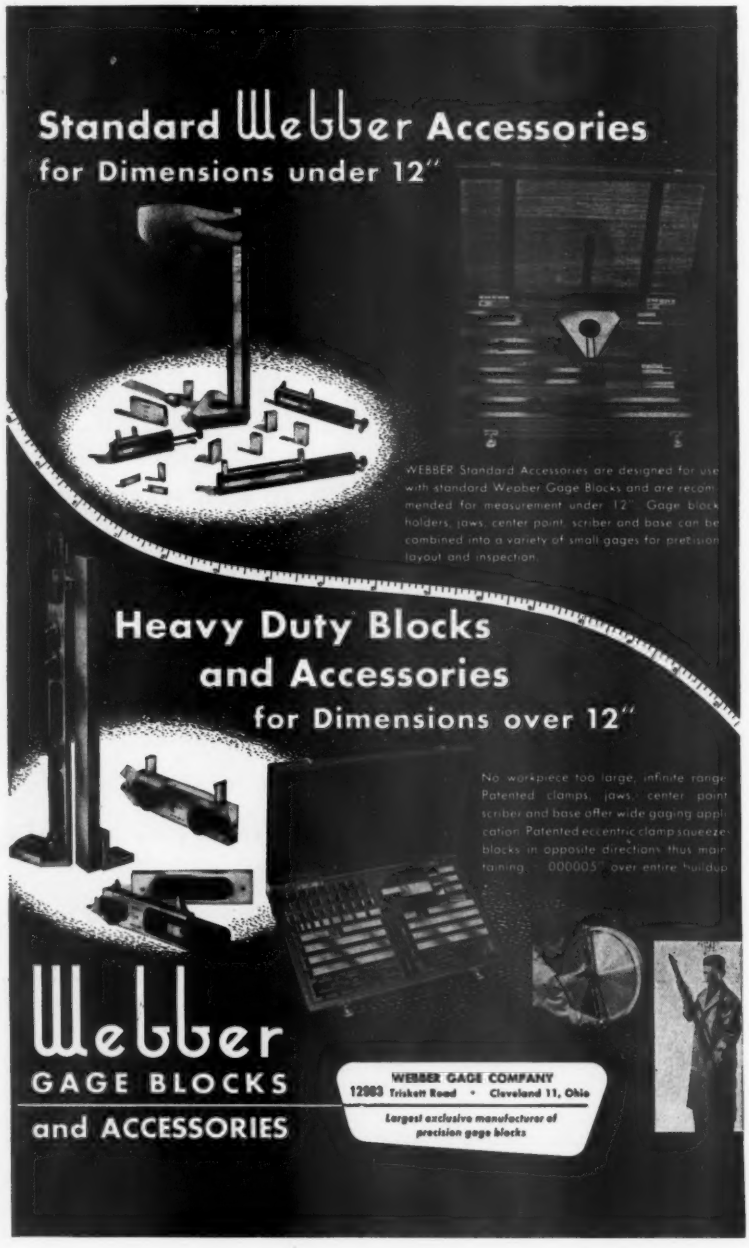


Can and Container Making Machinery is featured in a new 32-page catalog now being issued by the E. W. Bliss Co., Canton, Ohio. This booklet contains illustrations and specifications on automatic and semi-automatic machines.
Circle Inform-A-Gram No. B44.

Protective Sleeves and Boots form the breech in industry's fight against machine wear caused by dust, contaminated oil, water and the hazards of heat and cold. A new bulletin offered by A & A Manufacturing Co., 2017 West Clybourn St., Milwaukee 3, Wis., explains how.
Circle Inform-A-Gram No. B45.

Automatic Milling Machines are the theme of a new 20-page catalog offered by the Cincinnati Milling Machine Co., Cincinnati, Ohio. Highlights of a design plus specifications, dimensional drawings and equipment are some of the features presented.
Circle Inform-A-Gram No. B46.

Coated Abrasive Belts increase production in two-man shops—or 200-man shops! How this is done is fully explained in "Behr Facts," a bulletin on abrasive and tape developments published by Behr-Manning Corp., Troy, N. Y.
Circle Inform-A-Gram No. B47.


Standard Webber Accessories
for Dimensions under 12"
WEBBER Standard Accessories are designed for use with standard Webber Gage Blocks and are recommended for measurement under 12". Gage block holders, jaws, center point, scriber and base can be combined into a variety of small gages for precision layout and inspection.
Heavy Duty Blocks
and Accessories
for Dimensions over 12"
No workpiece too large, infinite range. Patented clamps, jaws, center point, scriber and base offer wide gaging application. Patented eccentric clamp squeezes blocks in opposite directions thus maintaining .000005" over entire buildup
Webber
GAGE BLOCKS
and ACCESSORIES
WEBBER GAGE COMPANY
12983 Triskett Road • Cleveland 11, Ohio
Largest exclusive manufacturer of precision gage blocks

Cold Finished Carbon Steel Bars—a guide to their selection, use and relative cost is now available from the Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.
Circle Inform-A-Gram No. B48.

Vascoloy-Ramet Corp. of Waukegan, Ill., has just issued a new 56-page carbide catalog showing its complete line, including 15 new items on blank, tools and toolholders, plus 12 pages of technical information on carbide and its uses.
Circle Inform-A-Gram No. B49.

Heat-Treating Installations are more in demand now due to developments in the light metal field. Descriptive information concerning these furnaces is on hand from the Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Circle Inform-A-Gram No. B50.

Devoted to Carbide-Tipped circular saw blades and cutting tools is the new Karbide King catalog now available from DeLuxe Saw and Tool Co., 1314 Kinnear Rd., Columbus 8, Ohio. The manual explains cost cutting qualities.
Circle Inform-A-Gram No. B51.

The Press Brake Is A Versatile Machine and essential to sheet metal and plate fabrication. The Cincinnati Shaper Co., Cincinnati 25, Ohio reviews some of the many applications of its line of All-Steel Press Brakes with numerous illustrations.
Circle Inform-A-Gram No. B52.

Optical Tooling Instruments for Aircraft is the subject of a bulletin on Alignment Telescopes furnished by Farrand Optical Co., Inc., Bronx Blvd. & E. 238th St., New York, N. Y. The circular is the first of several bulletins pertaining to instruments and accessories for optical tooling systems.
Circle Inform-A-Gram No. B53.

U. S. Multi-Slide Machines are described in full in a new illustrated catalog presented by the U. S. Tool Co., Inc., East Orange, N. J. The new bulletin contains specifications for the four sizes of machines now built by U. S. Tool primarily for automatic high speed production of precision metal stampings from coil stock.
Circle Inform-A-Gram No. B54.

Multi-Max Line of Punch Presses is described in a new 8-page three color catalog now available from the Diamond Machine Tool Co., 5111 Coffman-Pico Rd., Pico, Calif. Containing specifications on the 23, 36, 48 and 60-inch ram size presses this non-technical publication gives complete information on many constructive features including the new clutch equilibrator.
Circle Inform-A-Gram No. B55.

Liquid Phenolic Casting Resin is featured in a technical discussion on the Use of Durez 7421A conducted by Rezolin, Inc., 5736 West 96th St., Los Angeles 45, Calif.
Circle Inform-A-Gram No. B56.

Time and Money Saving Machine Tool Accessories are pictorially treated in new bulletin 5311 from South Bend Lathe, South Bend 22, Indiana. Collets, taper attachments, tool holders, tool post grinders, etc.
Circle Inform-A-Gram No. B57.

Bench Model Universal Box and Pan Bending Brake is described in new mailing piece from Dries & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36, Ill. Full specifications given on this had operated, speedy and accurate device.
Circle Inform-A-Gram No. B58.

Secret of the Efficiency of the low cost Brush-Flush parts cleaning unit for maintenance tool and die work and many production jobs is the fact that solvent is pumped through the appliance handle. Literature now ready for distribution.
Circle Inform-A-Gram No. B59.

B-K #7 Drill Jig Cement eliminates the distortion caused by a large number of press fit bushings in complicated jig work. This method has other advantages, detailed in literature now available from Sheridan Products, 1054 East Hyde Park Blvd., Inglewood 3, California.
Circle Inform-A-Gram No. B60.

Fastening Wood to Metal is Simple, speedy and cheap with the R-1018 lockbolt by Huck Manufacturing Co., 2480 Bellevue Ave., Detroit 7, Michigan. New bulletin sheet gives operation sequence, specifications, etc. Production speeds possible up to 2000 completed fastenings per hour.
Circle Inform-A-Gram No. B61.

Publication of a Condensed Control Catalog is announced by the Burling Instrument Co., 5 Vose Ave., South Orange, N.J. Included is a general description of all Burling electric temperature controls and separate descriptions of the company's pneumatic and valve type controls.
Circle Inform-A-Gram No. B62.

The "Hows, Whys, and Wherefores" of Riveting with Hi-Shear rivets are graphically illustrated in the newly published third edition of "Riveting with Hi-Shears" just published by the Hi-Shear Rivet Tool Co., 8924 Bellanca Ave., Los Angeles 45, Calif. Contains a vast amount of helpful material on some of the most up-to-date rivet setting procedures, plus full equipment data.
Circle Inform-A-Gram No. B63.

Machine Parts that must Resist Wear, corrosion, impact, indentation and high temperatures are well served by Colmonoy castings. Folder from Diamonds & Tools, Inc., 19345 John R. Street, Detroit 3, Michigan has a deal of data.
Circle Inform-A-Gram No. B64.

"Little Gem" Steel Storage Cabinet gives very quick access to a wide variety of tiny parts. Drawer measures 11″ x 11″ x 1¼″, and accommodates up to 28 adjustable compartments enclosed on all four sides and bottom. Full data—Equipto Div., Aurora Equipment Co., 422 Cleveland Ave., Aurora, Illinois.
Circle Inform-A-Gram No. B65.

"Marvic Machinists Operating Manual" is title of a new 38 page booklet from Marvic, Inc., 350 Peninsular Ave., San Mateo, Calif. Full data on a new approach to the problem of holding lathe cutting tools for the heaviest operations.
Circle Inform-A-Gram No. B66.

Multi-Low Range Universal Tester by W. C. Dillon & Co., Inc., 14620 Keswick St., Van Nuys, California has four scales for maximum versatility, is fully described in new bulletin LR-2. Complete price lists for machine and attachments, plus full pictorial illustration treatment.
Circle Inform-A-Gram No. B67.

MÄGERLE HYDRAULIC SURFACE GRINDERS

AUTOMATIC DOWN FEED
•
AUTOMATIC FINISH SIZING

A work measuring instrument reveals the difference between work size and required final size during the grinding operation . . . The automatic feeding and sizing is powered by a separate electrical unit . . . The machine requires no attendance during the grinding operation

Finishes within .0002 on repeated chuck loadings automatically . . . Rapid traverse is provided for both head and cross slide . . . Extremely rugged construction and very easy to operate . . . Available in 2 foot, 3 foot and 4 foot models . . .

Write for Our Eight-Page, Illustrated Circular.

PELLOW MACHINE CO.
13500 FOLEY AVENUE • DETROIT 27, MICHIGAN

Hard Facing Welding Rod properties, applications, and use methods are described in bulletin 102 from Wall-Colmonoy Corp., 19345 John R St., Detroit 3, Michigan. Very abrasion and impact resistant.
Circle Inform-A-Gram No. B68.

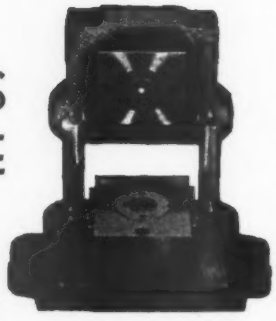
Movable Differential Scale System is feature of Mora precision height gage by Brand Tool & Supply Co., 907 S. Victory Blvd., Burbank, Calif. May also be used as dial indicator and dial platform gage. Full data and prices in current literature.
Circle Inform-A-Gram No. B69.

Accuracy and Concentricity with plus features of long life and a wide selection from standard are boasted by drill jig bushings from Accurate Bushing Company, 447 North Ave., Garwood, N.J.
Circle Inform-A-Gram No. B70.

Airless Blast Cleaning in the nonferrous foundry is described in new bulletin 904 from American Wheelabrator & Equipment Corp., 1183 S. Byrkit St., Mishawaka, Indiana. Case histories cover cost reductions effected in brass, bronze, aluminum and allied fields.
Circle Inform-A-Gram No. B71.

"A MUST wherever WASHERS are made!"

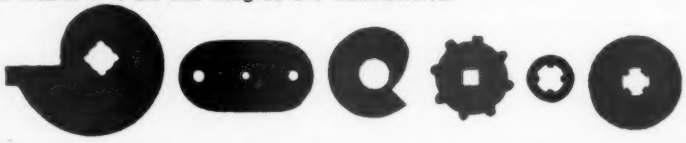
HOVIS
OFFERS YOU THIS SIMPLE, UP-TO-THE MINUTE METHOD



There's no need to make a complete new Die for any type washer or blank. The HOVIS UNIVERSAL WASHER DIES provide a Master Holder and by merely changing 5 SMALL, EASILY REMOVABLE PARTS the new washer or blank is produced . . . Special sets of parts are available for use in Master Washer Units enabling customers to produce irregularly shaped pieces and shallow draws. Multi-Washer Dies are also designed and manufactured.

Made in 5 sizes:
¾"—1½"—2½"—4"—6"

Write for literature.



HOVIS SCREWLOCK COMPANY
8100 E. NINE MILE ROAD
Phone: Slocum 7-4800
VAN DYKE, MICHIGAN
Suburb of Detroit

Two New Press Bulletins. The Federal Machine & Welder Co., Warren, Ohio, has just released bulletins on its Warco straight side double crank presses and on its pneumatic clutch and brake. Full data and engineering drawings, plus photographs and specifications tables give an orderly and complete picture.
Circle Inform-A-Gram No. B72.

Rotary Tables, Universal Dividing Heads, high precision angle iron blocks and precision die sawing and filing machines are all briefly described in a catlalog sheet from Cedar-West Tool Co., Inc., 90 West St., New York 6, N.Y.
Circle Inform-A-Gram No. B73.

Precision Offset Boring Heads and Tools are described in a new catalog from Flynn Mfg. Co., 133 Flowerdale Ave., Ferndale 20, Mich. A complete line is fully covered in 8 quickly readable pages.
Circle Inform-A-Gram No. B74.

Carbide Tool and Cutter Grinding can be speeded with "XL" bond wheels, much outperforming conventional silicon carbides. Eng'g data from Chicago Wheel & Mfg. Co., 1101 Monroe St., Chicago 7.
Circle Inform-A-Gram No. B75.

Full Operational Data on Valvair Solenoid Pilot Valve for handling air, vacuum, oil, water and inert gases is given in new bulletin "PB" from the Valvair Corp., Akron 11, Ohio. Also features, specifications, drawings and ordering information.
Circle Inform-A-Gram No. B76.

Press Production Increase of More than 500% is possible with the "Rol-di-Feed" from H. E. Dickerman Mfg. Co., Dept. H23, Albany St., Springfield, Mass. Longer die life between regrinds.
Circle Inform-A-Gram No. B77.

Invaluable for Accurate Angle Measurement, the Derry angle computer measures in degrees and seconds any angle simple or compound. Design makes possible only one set-up of work. Catalog from Scientific Eng'g., 11126 Weddington, N. Hollywood, Calif.
Circle Inform-A-Gram No. B73.

V Belt Matching Machines are described in new brochure FVM 124 C from the Smith Power Transmission Co., 1545 E. 23rd St., Cleveland 14, Ohio. Includes operational data and all specifications.
Circle Inform-A-Gram No. B79.

Special Gages and Jigs, Fixtures and Dies are made to your order by Atlas Tool and Die Wks., 2838 W. 21st St., Chicago 23, Ill. Full information on facilities and service now available.
Circle Inform-A-Gram No. B80.

The Reeves Flex-Speed Drive, the latest addition to the line of variable speed drive controls, is introduced in a four-page booklet now being distributed by the Reeves Pulley Co., Columbus, Ind.
Circle Inform-A-Gram No. B81.

New Chuck Catalog No. 753 has just been published by the Westcott Chuck Co., Oneida, New York. All chucks in the company line are illustrated and fully described, giving a very comprehensive picture of some of the best equipment in this line.
Circle Inform-A-Gram No. B82.

Standards in 42 Sizes are listed in the new SPS bulletin on Hallowell steel shaft collars. They are for shafts from 3/16" to 3" in diameter. Application and installation photographs and drawings also given.
Circle Inform-A-Gram No. B83.

Ideal For Stripping Action in all types of dies, the Wales Hydra-Spring has force up to 3800 pounds. Full data on the various unit models is given in new catalog from Wales-Strippit Corp., 345 Payne Ave., N. Tonowanda, New York.
Circle Inform-A-Gram No. B84.

Four Way Drilling, Boring and Facing Machine for aircraft engine jet housings is described in recent bulletin # 103-34 from Modern Industrial Eng'g Co., 14230 Birwood, Detroit 4, Michigan. Complete operating description and specifications are given.
Circle Inform-A-Gram No. B85.

Production Facilities at Your Disposal at Stryker Machine Products Co., 253 John Fitch Way, Trenton, N. J., include automatic screw machines, turret lathes, inspection equipment, etc. This company is able to process any part from new raw material to completed job.
Circle Inform-A-Gram No. B86.

Airtherm "Metalworker" All Steel Press Brakes are subject of catalog 907 from Airtherm Mfg. Co., 700 South Spring, St. Louis 10, Mo. All features and specifications of a complete model range given.
Circle Inform-A-Gram No. B87.

How a Wide Variety of Design Problems Were Solved with self-locking fasteners is described in detail in a new 32 page booklet available from the Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J. Examples of how weight savings reductions in assembly time, simplified design, maximum joint security, and similar benefits were obtained is described and illustrated in case history form.
Circle Inform-A-Gram No. B88.

Designing, Building, Sharpening and Reconditioning of broaches, bars, and fixtures are described in a new folder put out by the Cleveland Broach Inc., 1061 E. 260 St., Cleveland, Ohio. Modern facilities give micro-precision with speed and low cost.
Circle Inform-A-Gram No. B89.

Stronger, Harder, and Springier than the usual drawing brasses, "Formbrite" still retains remarkable ductility for forming and drawing and takes sharp, clean-cut ornamental die impressions. 12 pager from American Brass Co., Waterbury 20, Conn. Catalog B-39.
Circle Inform-A-Gram No. B90.

Filtration of Quenching Oils is described in latest bulletin from Industrial Filtration Co., Dept. No. 00538, Lebanon, Indiana. Typical field installations are shown.
Circle Inform-A-Gram No. B91.

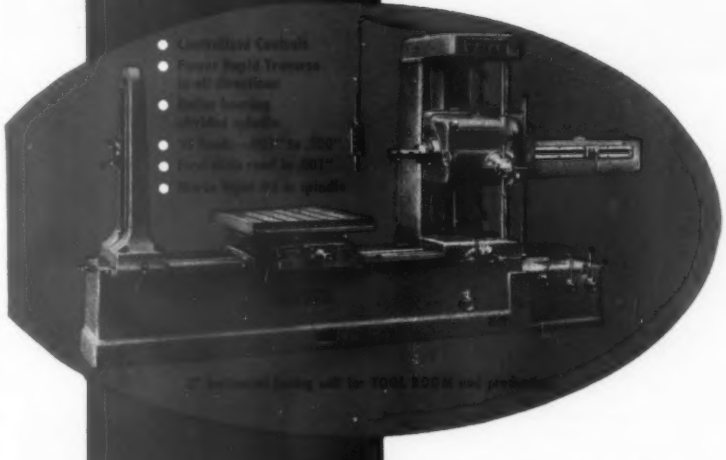
Power Impact Sockets, Extensions, Adaptors and Drivers for use with Ingersoll-Rand, or any other standard air or electrically powered tool are announced by Cornwell Quality Tools Company, 1056 Cleveland Avenue, Mogadore, Ohio. These tools are designed for maximum wear resistance and long life from solid bars of chrome molybdenum steel.
Circle Inform-A-Gram No. B92.

immediate delivery

3" horizontal boring mill for TOOL ROOM and production

table top swivels full 360°

18 speeds—17 to 910 r.p.m.



WOTAN

over 75 years of "know-how" in the manufacture of precision production machinery

Users of the WOTAN Boring Mill find that advanced engineering and expert craftsmanship have combined to produce an outstanding piece of tool room equipment that is also well suited to long and short production runs.

Simplicity of design permits an unusually low price. Parker Machine Company has these mills on hand for immediate delivery. Write or phone John Schleiffer at our Brooklyn headquarters for full information.

Parker Machine Company, Inc.
158 PIONEER ST., BROOKLYN 31, NEW YORK • TRIANGLE 5-2103 and 2157

Cemented Carbide Drilled, Tapped, Threaded and Broached to tolerances of .001". Die revisions, corrections machined in hardened state with no material change. Service by Arc Machining Inc., 732 N. Rochester Rd., Clawson, Michigan.
Circle Inform-A-Gram No. B93.

Special Gages and Jigs, Fixtures and Dies are made to your order by Atlas Tool and Die Wks., 2838 W. 21st St., Chicago 23, Ill. Full information on facilities and service now available.
Circle Inform-A-Gram No. B94.

Airtherm "Metalworker" All Steel Press Brakes are subject of catalog 907 from Airtherm Mfg. Co., 700 South Spring, St. Louis 10, Mo. All features and specifications of a complete model range given.
Circle Inform-A-Gram No. B95.

Hard Facing Welding Rod properties, applications, and use methods are described in bulletin 102 from Wall-Colmonoy Corp., 19345 John R St., Detroit 3, Michigan. Very abrasion and impact resistant.
Circle Inform-A-Gram No. B96.

To Protect Their Ships From Unseen Dangers . . .

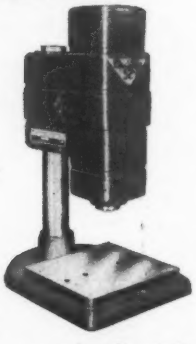
Mariners Use Marking Devices

Guiding his ship through shoal, narrow or treacherous waters, the Mariner depends on channel buoys, lighthouses, flashing lights, and other marking devices—all directing him to his safe course through navigable water.

CADILLAC 52

Air Impact Press For High Speed Marking—

Assembling, Branding, Staking, Crimping, Riveting and also for producing Light Stampings



This new Cadillac "52" is faster, has more power, more pressure. It delivers in speeds up to 10,000 strokes per hour — pressure can be obtained up to 8 tons, and is adjustable from light to heavy marking. The pressure can also be regulated to give proper ram action for branding or color leaf marking. Special jigs or fixtures are not required for average work. The Cadillac "52" has automatic controls which "think" for the operator — give high production. Can be supplied as: Hand actuated, foot actuated, electrically actuated. It is light in weight, can be easily moved.

For full information write for Bulletin A-52

DIE INSERTS

ROLL SEGMENT DIES

FORGING HAND STAMPS

Many marking problems can be solved by Cadillac Marking Devices such as these . . . all made of special alloy tool steel, giving long life and unexcelled performance.

For full information write for Bulletin SE-130

CADILLAC STAMP CO.

FACTORY and OFFICES

17303 RYAN ROAD • DETROIT 12, MICH.

Lok-Thred Studs, Screws and Bolts are analysed in an exceedingly comprehensive bulletin now available from National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, Ohio. The bulletin condenses a great deal of information on performance and design characteristics into 23 interesting pages, includes many microphotographs, engineering drawings, analyses. Also section on recommended gaging practice.
Circle Inform-A-Gram No. B97.

Production Speeding Measuring Equipment is graphically portrayed in a new catalog sheet from the O-Vee Gauge Co., 2516 West Vernon Ave., Los Angeles 8, Calif. Screw thread comparators and gages are featured.
Circle Inform-A-Gram No. B98.

"This Carbide Age" is title of an interesting brochure from the Wesson Metal Corp., Lexington, Ky. It constitutes an interesting study of carbide developments and present-day applications in the cutting tool field. Wessonmetal carbide tools fully featured.
Circle Inform-A-Gram No. B99.

Addition To Cutting Tool Line. A new line of high speed end mills and counterbores is described and illustrated in new catalog by the Besly-Welles Corp., Beloit, Wis. Includes single and double end mills, ball end mills, holders, plain and adjustable hollow mills, taper and straight shank counterbores.
Circle Inform-A-Gram No. B100.

"Getting Down to Cases on Metal Cutting" is title of a new booklet published by E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia, Pa. Has 30 pages, each giving illustrated applications and set-ups for a wide variety of machining jobs, with suggestions on superior coolant practice for best results.
Circle Inform-A-Gram No. B101.

First Choice for Making High Precision Dies, jigs, and fixtures, the new 12" rotary table by Kenco Mfg. Company, 5211 Telegraph Rd., Los Angeles 22, Calif., has many exclusive features, is described in a new bulletin from the maker. Fully illustrated.
Circle Inform-A-Gram No. B102.

Industrial Applications where Ammonia and other gases, non-corrosive to steel, are used are suitable for the newly designed valve designed by the Henry Valve Co., 3215 North Ave., Melrose Park, Illinois. All data is given on the complete line.
Circle Inform-A-Gram No. B103.

Invaluable for Accurate Angle Measurement, the Derry angle computer measures in degrees and seconds any angle, simple or compound. Design makes possible only one set-up of work. Catalog from Scientific Eng'g., 11126 Weddington, N. Hollywood, Calif.
Circle Inform-A-Gram No. B104.

An Expanded Ferrous Casting Service is described in new 12 page brochure from Detroit Gray Iron Foundry Co., 282 Iron St., Detroit 7, Michigan. Formulae for estimating casting weight are a feature, also tables showing physical properties and chemical range of the firm's standard alloyed east irons.
Circle Inform-A-Gram No. B105.

High Pressure Dry Steam for all indoor cleaning jobs and a special high-pressure wet cleaning system are described in an illustrated brochure from Livingstone Engineering Company, 100 Grove Street, Worcester, Mass. Big labor cost cutting.
Circle Inform-A-Gram No. B106.

Saving on Set-Up Time with the versatile Brown utility vise is the theme of a new four page folder now available from Brown Engineering Company, Reading, Pa. This vise will accept many different object shapes on miller, shaper, drill press, grinder, etc., that normally require several types of vises. Construction features, applications, specifications.
Circle Inform-A-Gram No. B107.

Newly Designed Welding Tips and Holders are included in new resistance welding bulletin RW-la, just released by Ampco Metal, Inc., 1745 South 38th Street, Milwaukee 46, Wis. Also other details—plus reference tables and comparitive charts giving physical properties, applications, and RWMA specification data.
Circle Inform-A-Gram No. B108.

For Grinding Carbide Tools, the new black silicon wheels by the Macklin Co., Jackson, Michigan, are featured in literature now available. Helpful data is given on different grain structure requirements for a variety of jobs.
Circle Inform-A-Gram No. B109.

Filtration of Quenching Oils is described in latest bulletin from Industrial Filtration Co., Dept. No. 00538, Lebanon, Indiana. Typical field installations are shown and discussed.
Circle Inform-A-Gram No. B110.

Present Day Malleable Iron Castings are the subject of new folder # 13 from the Belle City Malleable Iron Co., Racine, Wisconsin. Helps tell you whether this material is suitable for your needs.
Circle Inform-A-Gram No. B111.

Punching and Notching in Mild Steel ¼" Thick are possible with the type NJ units described in catalog CJ from the Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, New York. Engineering drawings and set-up illustrations.
Circle Inform-A-Gram No. B112.

Steel Shelving, Lockers, and other storage and maintenance equipment is subject of new catalog from Precision Equipment Co., 3712 N. Milwaukee Ave., Chicago 41, Ill. A popular joke column is included in the catalog.
Circle Inform-A-Gram No. B113.

Detachable and Versatile, the Nava-Mar vise face plate by the Kenimar Corp., 2 Oakridge St., Greenwich, Conn., is described in new literature. In a variety of different styles, instantly fitted to any vise.
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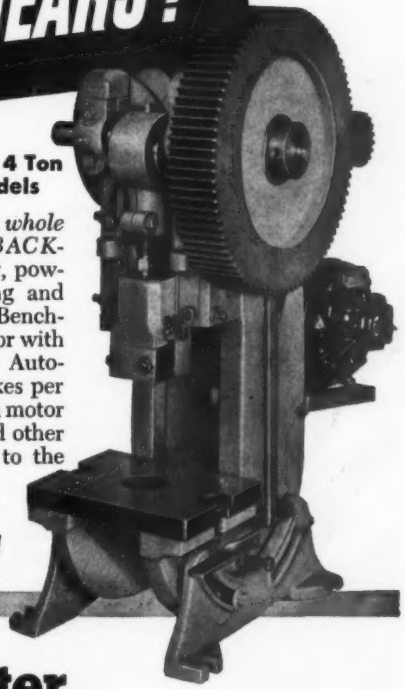

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Shuster Wire Straightening and Cutting Machines are described in a bulletin put out by Mettler Machine Tool, Inc., New Haven, Conn. Operation and mechanical advantages of the units are pointed out in the illustrated booklet.
Circle Inform-A-Gram No. B115.

Portable Pantograph Engraver made by Micro Instrument Co., 88 East Trowbridge St., Cambridge 38, Mass., is illustrated and described in the firm's latest booklet. The product is used for 2-and 3-dimensional engraving and precision duplicating.
Circle Inform-A-Gram No. B116.

Safer Operation of Power Presses with new sweep guards and slide feeds is the subject of three new brochures being distributed by the Cooper Weymouth, Inc., 277 Noble Ave., Bridgeport 8, Conn. Specifications and general information concerning the products are included in the literature as well as data on the safety factors.
Circle Inform-A-Gram No. B117.

A Useful Guide Book to carbide tipped boring tools is now procurable from Ariel Products Co., 4050 W. 123rd St., P. O. Box 111, Blue Island, Ill.
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Porter Punches are in stock in all principal cities.

How To Solve Punch Press and Shear Vibration Problems is explained in three current pamphlets compiled by The Korfund Co., Inc., 48-15 32nd Place, Long Island City 1, N. Y. Advantages and special features of Korfund products are included.
Circle Inform-A-Gram No. B119.

National Research Corp., 70 Memorial Dr., Cambridge, Mass., offers reprints of a recent article, "Economical Finishing With Vacuum Metallurgy." Described is the use of the vacuum metallizing process in manufacturing plastic and metal parts.
Circle Inform-A-Gram No. B120.

Machine Tools and Accessories are described in detail in a new 180-page catalog completed by Morey Machinery Co., Inc., 410 Broome St., New York 13, N. Y. The booklet contains information on European as well as domestic products.
Circle Inform-A-Gram No. B121.

How Airless Blasting Can Be Used in cleaning rooms in malleable foundries to bring about sizeable savings is shown by a number of case histories presented in a new bulletin published by American Wheelabrator & Equipment Corp., 1183 Byrkit St., Mishawaka, Ind.
Circle Inform-A-Gram No. B122.

Information on Diamond Wheel Dressers, Thread Grinding, Boring and Turning Tools is available upon request from Clipper Diamond Tool Co., Inc., 21 W. 46th St., New York 36, N. Y. The firm has recently published a catalog on its various products.
Circle Inform-A-Gram No. B123.

A New Reference for Users of Rotary Files, Cutters and Carbide Tools is currently being distributed by the R. G. Haskins Co., 2651 W. Harrison St., Chicago 12, Ill. It is complete with a "recommended operating speed" chart.
Circle Inform-A-Gram No. B124.

Industrial Controls Are Described and Illustrated in the Minneapolis-Honeywell Regulator Co., Wayne and Windrim Aves., Philadelphia 44, Pa., catalog 8305 on non-indicating electric, electronic and pneumatic products for temperature pressure and humidity.
Circle Inform-A-Gram No. B125.

Heat Treating—New Slants and Some Old Tricks—is the theme of a recent publication of the Lindberg Engineering Co., 2460 W. Hubbard St., Chicago, Ill. The illustrated circular features articles on surface hardening and heat treating failures.
Circle Inform-A-Gram No. B126.

Details on the New 100-Ton Die Tryout Press is being offered by Alpha Tool Works, 9281 Freeland Ave., Detroit 28, Mich. Booklet includes facts on uses and applications of unit.
Circle Inform-A-Gram No. B127.

Data On The Ease of Set-Up and Accuracy of Rol-Di-Feeds by H. E. Dickerman Mfg. Co., 323 Albany St., Springfield, Mass., is now available. Pictures and literature explains variety of work of unit.
Circle Inform-A-Gram No. B128.

Get The Whole Story On New Standard Tooling Developments by writing The Gairing Tool Co., 21227 Hoover Rd., Detroit 32, Mich. Catalog concerns the E-Con-O-Mill milling cutters.
Circle Inform-A-Gram No. B129.

Precision Patterns On Glass are now being produced in a newly completed laboratory for development work in reticles, circular and linear scales at W. & L. E. Gurley, Troy, N. Y. Literature available upon request.
Circle Inform-A-Gram No. B130.

Full Information Is Available on tool and cutter grinders, engine lathes, horizontal and vertical millers, vertical turret lathes and 16″ and 22″ shapers from Parker Machine Co., Inc., 158 Pioneer St., Brooklyn 31, N. Y.
Circle Inform-A-Gram No. B131.

Flexible Shaft Machines are featured in booklet now available from Stow Manufacturing Co., 82 Shear St., Binghamton, N. Y. Pamphlet shows how finishing operations such as grinding, sanding, wire brushing, polishing and filing are done.
Circle Inform-A-Gram No. B132.

Punches And Die Buttons by Porter Precision Products, P. O. Box 208, Cincinnati 15, Ohio, are fully explained in new catalog.
Circle Inform-A-Gram No. B133.

An Eight-Page Illustrated Catalog covering complete technical data on uses and applications of annealed carbonyl iron powders now offered by Magnetic Powders, Inc., 1058 Fairview Ave., Johnsonburg, Pa.
Circle Inform-A-Gram No. B134.

DIP-Pak #637. Essential difference from DIP-Pak #532 is that it is more suitable for a permanent coating, plating stop-off or other applications of this nature. Further data on this product available from Fidelity Chemical Products Corp., 470-474 Frelinghuysen Ave., Newark, N. J.
Circle Inform-A-Gram No. B135.

Just Off The Press is a new catalog, "C", on hole punching units courtesy of Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y. Brochure describes products developed especially for punching holes in angles, extrusions, shapes and sheets.
Circle Inform-A-Gram No. B136.

How The SAFEED Tool Eliminates Danger of cutting hands and gloves besides saving money and speeding up production for punch press operators is fully described in a small booklet just released by Affiliated Machine and Tool Co., 260 West St., New York 13, N. Y.
Circle Inform-A-Gram No. B137.

Information on Machine Tool Products is available by writing Fray Machine Tool Co., 515 Windsor Rd., Glendale 4, Calif. The company now has data on hand concerning its No. 10-R Universal ram, turret type and vertical milling machine.
Circle Inform-A-Gram No. B138.

A New Bulletin From Tumb-L-Matic, Inc., 4510 Bullard Ave., New York 70, N. Y., pictures and describes the "Wet Process" tumbling barrels—type XL. Circular explains drive mechanisms, electric controls of barrel construction.
Circle Infrom-A-Gram No. B139.

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CIRCULAR HEADS WITH TIE RODS
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SPACE SAVED
T-J SPACEMAKER . . . provides additional room for adjacent equipment without sacrificing strength.

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MACHINE TOOL DESIGN CHANGES

This paper is intended to present suggestions which would eliminate some of the problems encountered by Ford Motor Company when adapting machine tools to automation.

To date, practically all in-line transfer type machine tools built have been designed for manual loading and unloading. An operator pulls the part from the unload station of one machine, slides it over a gravity roll conveyor for an indefinite distance, and pushes it onto the load station of the next machine. In all cases, he also has manual push buttons which initiate the indexing cycle.

Practically all the in-line machines which have been ordered for the new Ford block and head lines have been of this type.

With the decision to fully automate the head and block lines, the Ford automation designer has had to convert machines which were originally designed for manual, to automatic operation. This conversion is sometimes difficult.

With the advance knowledge that machines will be served by automation, machine tool manufacturers could alter their designs to facilitate the designing and installation of automatic loading and unloading devices.

Here are a few suggestions for alterations:

All machines, when possible, should be designed as in-line "thru" machines. It is almost impractical to design automation for the "in-and-out" type of machine, and is impossible as far as high production is concerned. The part should never have to unload by reversing the path thru which it loaded.

It would facilitate the application of automation to always have the load and unload stations removable, and in many cases left off entirely. This condition is especially desirable in cases when available room is at a minimum and the removal of these stations would allow necessary space for automation.

The purpose of this type of automation is to receive parts from one transfer machine, index them to the next operation, and automatically start the machine cycle when the part is located in the load station.

The load station of an in-line machine is invariably an area within the range of the machines indexing bar. It usually consists of a pair of rails, or a horizontal flat plate supported on the machine by a knee casting, a weldment, or a continuation of the machine base.

When automation is used to locate a block in this loading area, the last index station of the automation shuttle may become the loading area. In this case, it is necessary to remove any loading station provided on the machine to make room for the automation.

The same reasoning applies to the unload end of the machine. When a machine is to

*Presented at the 17th Annual Machine Tool Electrification Forum, sponsored by the Westinghouse Electric Corporation, Pittsburgh, Pa., April 14 & 15, 1953.

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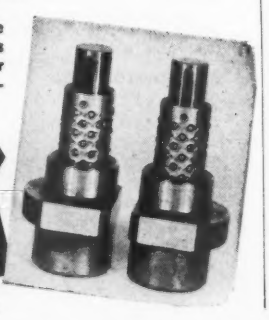
No frozen bushings, scored pins, pulled shanks or die damage due to misalignment or faulty lubrication. Dies last longer, (reported as high as 185% more pieces between grinds,) close more accurately, produce pieces with cleaner edges and less scrap. For literature, write to Lempco Products (Industrial Division), Bedford, Ohio.

One way of keeping the cost down is to achieve production performances as yielded by these pins and bushings in Lempco Die Sets—1700 strokes per minute for over 2½ years—a remarkable performance record.

Actual photograph of pins and bushings after 500,000,000 strokes



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INDUSTRIAL DIVISION BEDFORD, OHIO

To Facilitate Automation*

by R. Juengel
FORD MOTOR COMPANY
Detroit, Michigan

unload onto the automation unit it is sometimes necessary to remove the machines unload station.

Care should be taken in designing these machines, to avoid any obstructions before the load and after the unload ends which would interfere with the installation and operation of automation units. This would include protruding air or hydraulic cylinders, chip removal conveyor and drives, extended guide rails, electric conduit and hydraulic piping.

Side rail guides should be flared out to provide easy entrance for the automated part.

Great difficulty is experienced by the millwrights in locating machines accurately to dimension, because the centerlines of the load and unload stations are not definitely located.

As automation is usually designed and fabricated previous to the actual setting of the machine, and if the automation fabrication is to fit perfectly between them at a later date, the accurate locating of two machines in line is of vital importance.

A definite finished boss, or a construction hole should be provided at both load and unload ends; these locations to have a definite stated relationship to the position of the part in the first and last index position, or to the index fingers in full **forward** position.

This policy of locating all assembly dimensions to a construction hole is also applied to design of automation shuttles. Thus, if a shuttle is located accurately to the construction hole (a measurable point) all other assembly dimensions will also be consistently accurate.

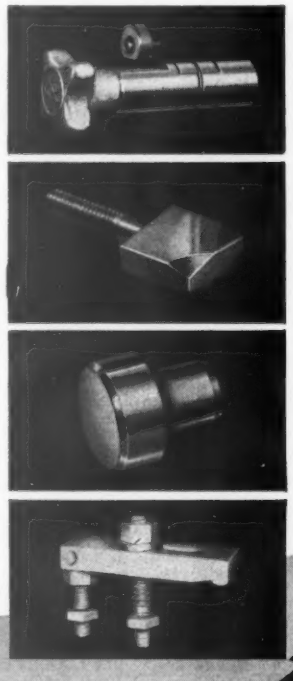
Machine tool manufacturers should attempt to hold their rough overall casting and weldment dimensions to print specification. While the index stations are accurately located to each other, the entire machined dimension system may float in location in the overall rough casting or weldment. This may leave excess rough casting or weldment stock, which will encroach on the available space left between set machines for the automation unit.

Positive stops or locating stop fingers should be provided in the load area as a safety measure in case of limit switch failure. This would prevent the automation unit from trying to push parts into the first work station.

Machine designers should avoid mechanically trapping the part which is being unloaded. If the machine is shut down with the unloaded part trapped, it is not possible for the automation to cycle. An automation unit should be able to cycle when the preceding in-line machine is shut down.

Access to the machining index stations and tooling should

. . . *Continued on page 108*



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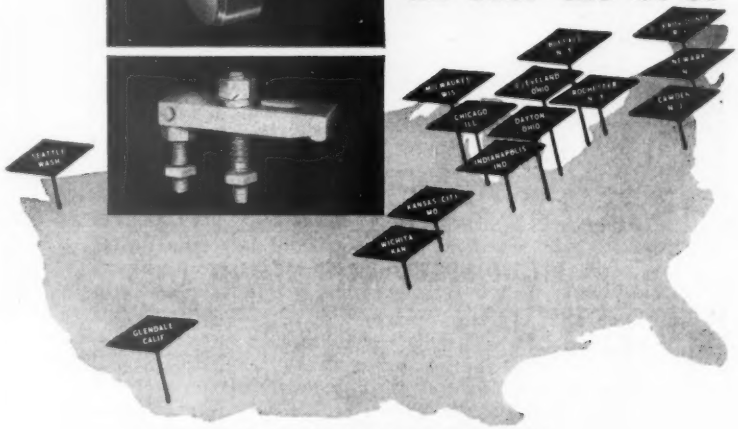

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Art Lewis Product Equipment Co. 422 Magnolia Ave.—GLENDALE 4 CALIF.
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Bell-Well Sales Co., 1323 N. Water St.—MILWAUKEE 2, WIS.
Columbia Eng. Co., 113-119 Sussex Ave., NEWARK, N. J.
Roessel & Co., 683 Hudson Ave., ROCHESTER 21, N. Y.
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Cummings & Co., 115 E. Lewis St.—WICHITA 2, KAN.

WEST POINT MFG. CO.
26935 W. 7 Mile Road, Detroit 19, Mich.

. . . Dicing Machines, from page 81

ing a lower temperature at the drawing station.

One typical die machine installation is a 50-ton machine. It is equipped with a single-roll feed, on the left-hand side, and an automatic assembling unit on the right-hand or outbound side. It is used in the production of a refrigerator condenser. The material is fed to the die. It is processed, with the exception of cutting off, then it is fed on to the serpentine tube, which is held in a fixture, and after it is fed onto the tube, the anvil, which is actuated from the mechanism at the top, flattens the wings. Then the piece is cut off and indexed. These condensers are made in lengths of 10 inches up to 28 inches.

Chain gearing on the side will allow assembling the fins onto the tube at any amount from two per inch to seven per inch. When the correct number of fins have been assembled, the machine stops, and a gate is swung open, the assembled flow removed, a new tube put in, and the cycle resumed.

Another type of automatic feed, that is used in expanded quantity production, is a double feed unit on the inbound side, which feeds the material and also roll forms the feed to the die, where it is expanded and then leaves the machine and goes into a special rolling machine. This particular machine operates at a speed somewhere between 600 and 700 strokes per minute, feeding two inches a stroke. The upper and lower crossfeeds were made from special, high-strength aluminum alloy, as well as the die set which is also made of aluminum.

The question has been raised: Why make the die shear out of aluminum? The answer, of course, is that any slight expansion in the punch holder will also take place in the die shear in the same amount.

Sid Tool Company

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SIZE	THREAD
4	32-48-50-64
5	30-32-36-48-80
6	36-40-48-56-60
7	32-40
8	24-30-36-38-40-44-48
9	24-28-32-40
10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	60-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
5/16	16-20-22-27-28-32-40
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-18-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24
1-5/8	5½-8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20-24
1-15/16	8-10-12-14-16-18-20-24-28
2	4-1/2-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16
2-1/4	4-½-8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	6
4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-11-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18
1-3/8	6-8-10-12-16-18-20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4½-10-12

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The Factors to be Considered When Purchasing a Double-Action Press.

(From the presentation made by Mr. Gordon Sommer, Chief Engineer, Clearing Machine Corporation, Hamilton, Ohio).

The arrangement of a punch and die in a single-action press would show the male punch mounted in the lower die shoe. A draw ring is mounted outside the lower punch and is supported by pressure pins which extend down through the die shoe, bolster plate, and contact the top of the pressure pad of the die cushion.

The die cushion exerts a constant force upward, but may be depressed by a pressure greater than the cushion pressure. A female die mounted in the slide completes the die setup.

In draw operations, the material is made to flow plastically into the shape required. As the upper die descends, it first confines the periphery of the blank between the upper die and the draw ring, and as it continues down, it pulls the blank over the punch and causes the material to take the shape of the punch.

This flowing of metal is actually a plastic flow, and not merely a folding operation, because the periphery of the blank has been confined during the en-

tire draw operation. This concept of plastic flow is a very important concept, if drawing operations are to be fully understood.

In a typical punch and die arrangement for use in a double-action press, the stamping is drawn open side up, rather than open side down, as with a single-action press. The blankholder slide replaces the cushion of the single-action press for blank holding pressure. The same type of action takes place as occurs in a single-action press, in that the periphery of the blanks is confined and the metal is made to flow plastically.

In both operations there is a plastic flow. It is a mechanical means of getting that plastic flow which is different.

One of the first questions logically asked in any discussion on double-action presses is, "Why are double-action presses used?"

Basically, a double-action press is used to perform those draw operations which cannot be done successfully in a single-action press, a very simple concept.

The line of usefulness between both types of press is sometimes not too distinct. However, experience indicates in general the limitations of a single-action press. A double-action press is generally required for the drawing of regular shape parts, with a depth of seven inches or more, while for a depth of between four to seven inches a single-action press might be appropriate for one part and a double-action press might be appropriate for other parts.

Regular-shaped stampings would ordinarily be round, square, or rectangular.

This limitation of single-action presses occurs because a die cushion is used for the blank holding pressure. More energy is required to depress the die cushion alone than might be available in the flywheel and motor of the press if the depth of draw becomes too great.

On the other hand, little or no energy is required in a double-action press to secure the blank holding pressure, thus the same stampings can be produced with a much smaller flywheel and motor. This works out in practice. A single-action press of considerably greater tonnage capacity is required to draw the same stamping in order to secure this additional energy with which to depress the die cushion.

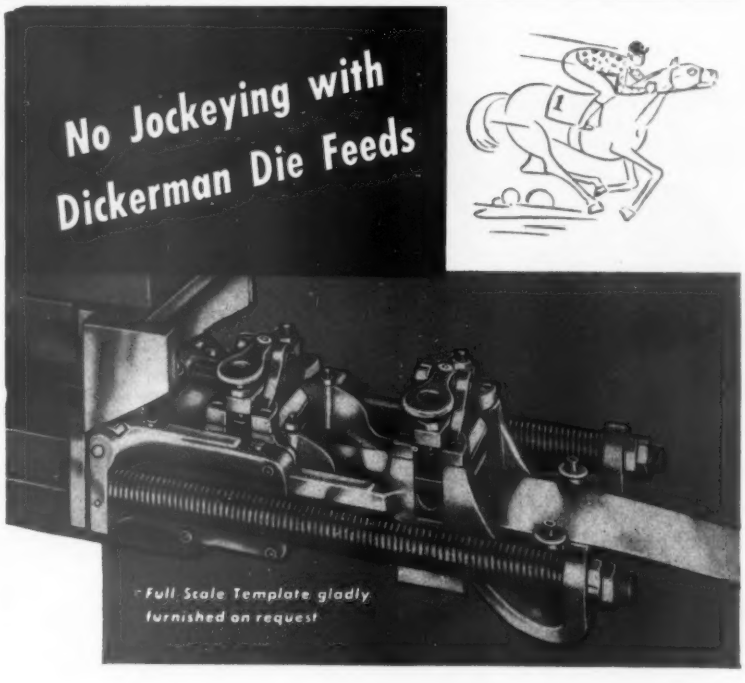
A double-action press is also desirable for the drawing of irregular shaped stampings, with a depth of three inches or more, but for a different reason.

With a double-action press it is possible to adjust separately each quarter of the blankholder slide, and thus vary the pressure at various points around the periphery of the drawn stamping. On most irregular shaped parts this becomes an absolute necessity.

The linear motion of the inner slide originates from a crank rotary motion, as does the slide of a single-action press. Therefore, it is necessary to consult a pressure curve to determine the capacity of the inner slide throughout its stroke.

A great deal of comment has

. . . Continued on page 110



Set-up men and press operators all know how critical starting a new coil can be into a complicated progressive die. Smash-ups at this point are costly both in down time and die repairs.

No need for both hands on the On and Off Control Buttons to "jockey" a new strip into position with Dickerman Die Feeds . On single trip or automatic operation, the feed advance is positive and accurate. Adjustments made for single trip operations when feeding a new coil or developing a new die, remain constant when the press is switched to automatic operation.

Experienced tool design and production men find this an invaluable feature of Dickerman Die Feeds in addition to their dependability and accuracy.

Write Dept. F for photographs showing variety of work fed with Die Feeds

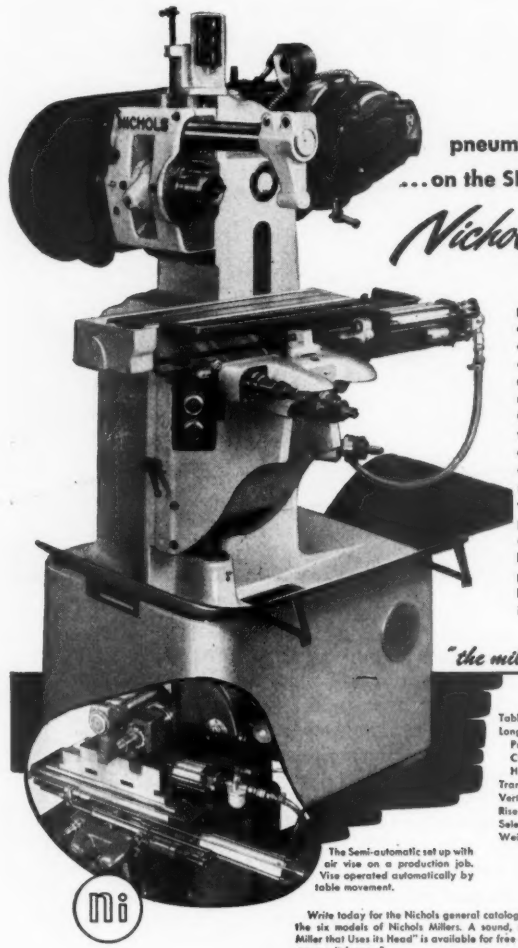
H. E. DICKERMAN MFG. CO.
323 Albany St. • Springfield, Mass.

. . . Automation, from page 105

be provided in the body of the machine. This will eliminate the necessity of removing an automation unit to gain access to the stations thru the end openings.

All mechanisms within an in-line machine should be designed to remain stationary after the stop button is pushed. If mechanisms are allowed to coast, or drift, a limit switch may be tripped initiating an automation cycle on the assumption that the machine cycle is complete.

An example of this condition exists on one well known make of in-line machine in the new Ford "8" block department. This machine utilizes a walking beam motion with levers actuated by a hydraulic cylinder. When the machine is shut down, the gravitational weight of the mechanism combined with the internal hydraulic leakage allows the transfer carriage to descend and could initiate an automation cycle before the machine is ready for loading.



pneumatic feed—for speed
...on the SEMI-AUTOMATIC
Nichols Miller

In selecting the Nichols Miller with pneumatic table feed, you obtain precision and a high-production semi-automatic machine. The push-button controlled power feed is entirely automatic — leaves the operator free to merely load and unload the work. Often he may run two or three millers with ease. The air cylinder works against the cutter and the hydraulic cylinder — completely eliminating chatter and table jump. The unit provides rapid advance from loading position to the cutter, infinitely variable cutting feed, and rapid return to loading position. Also available with power vertical feed to spindle head. If you want high production to "tenths", investigate the Nichols Semi-automatic!

"the miller that uses its head!"

CONDENSED SPECIFICATIONS

Table Working Surface	6¾" x 21"
Longitudinal Travel	
Pneumatic	9"
Cutting Stroke	5½"
Hand Screw (Optional)	10"
Transverse Travel	7"
Vertical Travel — Knee	13½"
Rise and Fall of Spindle	4½"
Selective Speed Ranges up to 5000 R.P.M.	
Weight	1250 lbs.

The Semi-automatic set up with air vise on a production job. Vise operated automatically by table movement.

Write today for the Nichols general catalog, which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?

MANUFACTURED BY W. H. NICHOLS COMPANY WALTHAM, MASSACHUSETTS

NATIONAL DISTRIBUTORS NICHOLS-MORRIS CORPORATION 76-X MAMARONECK AVE. WHITE PLAINS, N. Y.

Automation engineers always have difficulty in securing adequate machine prints to use as reference in designing automation. Prints supplied by machine tool builders either lack the necessary dimensions, or have these dimensions buried piecemeal in volumes of detail sheets. Automation requires prints which will show a complete plan and side view with related index station dimensions, and fairly detailed pictures of the load and unload stations. Electrical and hydraulic prints are also required to determine interlocking.

In order to automatically control an automated system, the hydraulic and pneumatic directional valves must be solenoid operated. The valves that affect automation operation are those which control machine elements operating in the load and unload areas. Each of these valves should be the double solenoid, 4-way type.

In the case of the transfer bar, a spring centered valve is most desirable. When the emergency stop button is pressed during a loading stroke, the transfer bar must stop instantly. Upon restarting, the bar must remain at rest until manually operated push buttons are used.

Hydraulic valves for operation of transfer fingers or dogs and positive stops should be two position valves so that return of power will cause these elements to be held in the position which existed before shutdown.

Specific information must be obtained through the use of limit switches in the load and unload stations of machines.

At the unload station it is necessary to place one limit switch which will be tripped by the part in the unload position and released when it is completely removed. The normally closed side of this limit switch is used to prevent the machine from transferring until the unload station is empty. The normally open side should be wired to a terminal strip in the control panel, to be used to initiate the automation cycle.

At the load station a limit switch, to be tripped by the part when correctly loaded, is required. This switch should remain tripped until the part has been removed from the loading station. The normally

closed side of the switch should be wired to a terminal strip in the control panel and the normally open side should be used in the machine cycle start circuit.

Since we are requiring that one side of a limit switch be wired into the automation circuit and the other side into the machine circuit, we must be aware of opposite polarities in the switch. In this situation it is best to use limit switches which do not require polarity considerations.

Sufficient switches must be placed to completely define the correct loading position of the machine. We must know when the transfer fingers are disengaged, a positive stop is up, a rotating fixture is in receiving position, or any other machine element which could interfere with loading, is clear of the loading area.

These limit switches can then be used to energize a relay which will define the fact that the machine is in a correct load position. In addition, normally closed relay contacts should be used in series with this relay guaranteeing that there is no impending motion which would interfere with loading. For example, we want to know that the fingers are disengaged and that the relay for engaging fingers is de-energized. Two normally open contacts from the "load position" relay should be wired to the control panel terminal strip. These contacts will be used in the automation circuit to prevent a shuttle from advancing unless the machine is in a correct loading position.

In cases where the normally open side of a limit switch is to be used in the machine circuit and is also required for automation, the switch contact should be used to energize a relay whose contacts can be used in both places.

A separate relay should be used to indicate the machine is in "automatic." One contact from this relay is to be used in the automatic start circuit of the machine.

The automatic starting circuit should have certain distinctive features as follows:

1. When a machine stop button, cycle stop button or emergency return button is operated, this circuit must be de-energized.

2. A separate push button should be used for automatic cycle set-up.

3. This circuit to be energized only while machine is operating automatically.

4. Machine automatic start to be initiated by:
   a. Part in load station
   b. Machine in receiving position
   c. Automation shuttle cycle complete
   d. Automation operating automatically

5. During fully automatic operation of the machine with automation, the cycle start push button or buttons must be ineffective.

6. During automatic operation of the machine with non-automatic operation of automation the machine cycle start button must be effective.

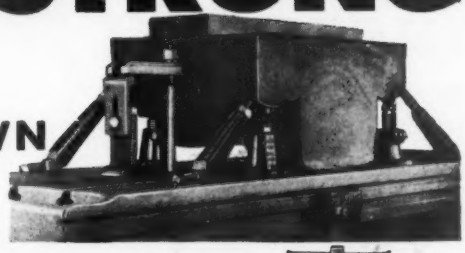
Two separate relays can be employed to accommodate these conditions.

Since automation is loading the machine once for every machine cycle, it is mandatory that

. . . *Continued on page 152*

ARMSTRONG

SET-UP *and* HOLD-DOWN TOOLS



ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents.

Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

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"The Tool Holder People"
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PLANER JACKS

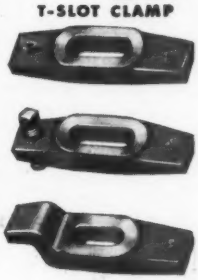
NON-SKID JACKS

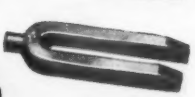
STEP BLOCK

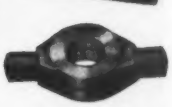
UNIVERSAL CLAMP

T-SLOT BOLTS AND NUTS

T-SLOT CLAMP






STRAP CLAMPS

. . . Double Action Press, from page 107

been made about tonnage. That is one of the most common causes of over-loading in any press; in the lack of realization that tonnage depends upon the stroke position.

The available pressure on a stroke might be as little as 25 per cent of the rated capacity of the press, because the press driving members are designed to deliver full tonnage of the rated capacity of the press at a point near the bottom of the stroke, and the actual point depends upon the type of press and the manufacturer.

Estimation of tonnage capacity required for the inner slide of the double-action press then is exactly the same as the calculation of the tonnage required for a single-action press, except that the blank-holding pressure is not added to the draw pressure as it is with the single-action press.

The die cushion used in a single-action press is replaced with a blankholder slide, which is power actuated from lines attached to the crank motion. The blankholder slide is made to dwell under pressure and keep the drawn stamping from wrinkling while the draw operation is being performed.

The capacity of the blankholder of a double-action press is usually about two-thirds of the capacity of the inner slide. This ratio gives a blankholder pressure which is sufficient for most draw operations. However, particular attention should be given to the drawing of these parts with sloping side walls, such as wheelbarrow bodies or bath tubs. Clearing Machine Corporation has furnished presses for the production of the latter which have required a capacity of 1000 tons on both the inner slide and blankholder slide.

When purchasing a double-action press, it is well to specify only the depth of draw, without trying to specify the strokes of the two slides.

This procedure will allow the press manufacturer to proportion these strokes so that the optimum dwell action can be obtained with the blankholder slide.

It usually works out that the blankholder slide has a stroke of about two-thirds of the inner slide stroke. A word of caution though. It is not necessarily true that the depth of draw is one-half the stroke of the inner slide less clearance, as would be with the single-action press, because the depth of draw is dependent upon the amount of dwell built into the blankholder slide. So in the purchase of any double-action equipment, it is doubly important that the depth of draw be ascertained and stated.

Die cushions are often used with double-action presses. Their tonnage does not have to be as large as if used in a cushion with single-action press. Their function here is to keep the bottom of the stamping flat and to lift the drawn stamping to the feed level of the die. Consequently, it does not require too much tonnage.

A cushion-locking device is frequently required, if the drawn metal is thin, to prevent the cushion from distorting the drawn part, because the blankholder slide retains the upper rim of the part for a short time after the inner slide has started the up stroke.

INGERSOLL
BLADES: $117.30
CHIPS: 27 TONS
Equipped with 34 carbide-tipped blades costing only $117.30, this 24" diameter Ingersoll Shear Clear Face Mill removes 27 tons of hard die block steel before the blades are used up in reabarpening.
Blades for Ingersoll cutters are of the highest quality, yet they are the most economical for you to buy because they are manufactured with good production equipment.
The low cost of replacement blades is another reason why you should use
INGERSOLL INSERTED BLADE MILLING AND BORING TOOLS
THE INGERSOLL MILLING MACHINE CO.
ROCKFORD, ILLINOIS
WRITE FOR NEW INGERSOLL CUTTER CATALOG No. 60H

The locking device retains the cushion in the downward position and can be released at any part of the up stroke.

The production rate of double-action presses is always of prime importance, because a production line usually consists of a double-action press, followed by several single-action presses for secondary operations. The production rate of the entire line is dependent upon the production rate of the double-action press.

Since the draw speed is limited by the shape of the drawn part and the type of steel used, a double-action press can be speeded up only by causing the inner slide to approach the work rapidly, slow down during the draw portion and again speed up on the up stroke.

This is exactly what has been done in Clearing's Hypo-Draw Press, which is giving a 50 to 70 per cent increase in production rate.

The Factors to be Considered When Purchasing a Straight-Side Press.

(From the presentation made by Mr. Norman Dunlap, Director of Sales for the Minster Machine Company, Minster, Ohio).

Straight-side presses, are the larger machines used in the stamping industry, and there is more modification and attachments available on the machines that fall in the straight-side category than there are in any of the other machines.

The reason for this is that it is one of the larger machines and consequently it is quite easy to take a straight-side press that is designed primarily for blanking work, having a long stroke in order to get the workpiece out, and when a slit draw job comes into the shop, the die area and the stroke are available; but perhaps it is not realized that the gearing and cushion arrangement is such that it should not be considered for draw work. But the press is big enough, the stroke is long enough, and with a little modification and whittling here and there, we can get the die in and that is usually what happens.

In considering the right press

. . . *Continued on page 114*

A.S.B.E. Annual Convention

The American Society of Body Engineers have formulated plans for the Eighth Annual Technical Convention to be held at the Rackham Memorial Building, 100 Farnsworth Avenue, Detroit 2, Michigan, on Wednesday, Thursday and Friday, October 28th, 29th and 30th, 1953.

There will be eight technical sessions in the Engineering Society of Detroit Auditorium directed by outstanding speakers and engineers in the Automotive Industry, who will disclose the latest developments and trends in Auto Body Styling, Materials and Production Engineering.

Exceptional displays are being arranged by leading suppliers and parts manufacturers in the Automotive Industry.

Mr. K. E. Coppock, President of The American Society of Body Engineers and Director of Engineering at Fisher Body Division, G.M.C. has chosen Mr. Wm. Norwick, Executive Assistant to Chief Engineer of Fisher Body as General Chairman.

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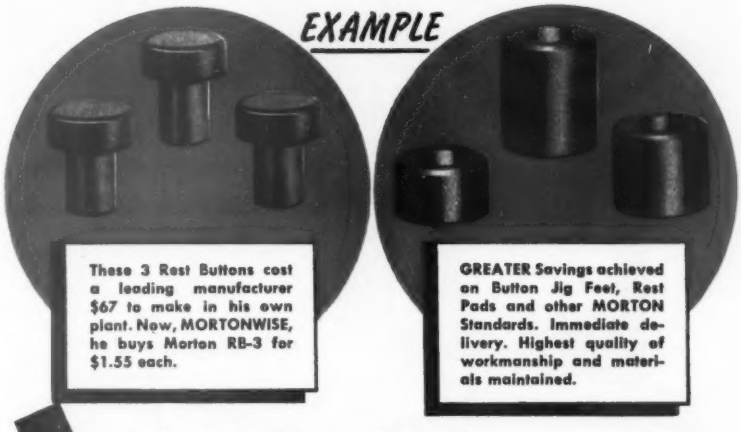
EXAMPLE



These 3 Rest Buttons cost a leading manufacturer $67 to make in his own plant. Now, MORTONWISE, he buys Morton RB-3 for $1.55 each.

GREATER Savings achieved on Button Jig Feet, Rest Pads and other MORTON Standards. Immediate delivery. Highest quality of workmanship and materials maintained.

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Instructive, Illustrated Catalog. Contains full size tracing templates of each product.

. . . of types and sizes of Fixture Clamps, Jack Locks, Cam Locks, Hand Knobs, Hand Wheels, Steel Ball Handles, Soft Chuck Jaw Blanks, Fixture Cams, Set-up Studs, Spherical and Plain Collar Nuts, Quarter Turn Screws, Fixture Keys, Spherical and Flat Washers, Shoulder Screws and allied items. Complete assemblies or individual parts. STANDARDS CAN EASILY BE MODIFIED TO SUIT YOUR APPLICATION.

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MEN YOU SHOULD KNOW . . . . . .

Robert J. Steele

John D. Knox

Paul D. Cornelius

L. A. Dixon

Larry A. Bard

Firth Sterling Inc., has announced the appointments of Robert J. Steele as general superintendent of the Carbide Division and John D. Knox as superintendent of the Powdered Metals Division. Mr. Steele came to Firth Sterling from the Carnegie-Illinois Steel Corp., Duquesne Works in 1934. Mr. Knox joined Firth Sterling in 1940 as an apprentice engineer. In 1948 he became superintendent of tool engineering and until his recent promotion held the position of project engineer in the Research Department.

◆

Paul D. Cornelius has been appointed to head the design and research department of Vlier Engineering, Inc. The author of several engineering papers and holder of a number of machinery patents, Cornelius was chief engineer for the J. O. Manufacturing Co. before his association with Vlier.

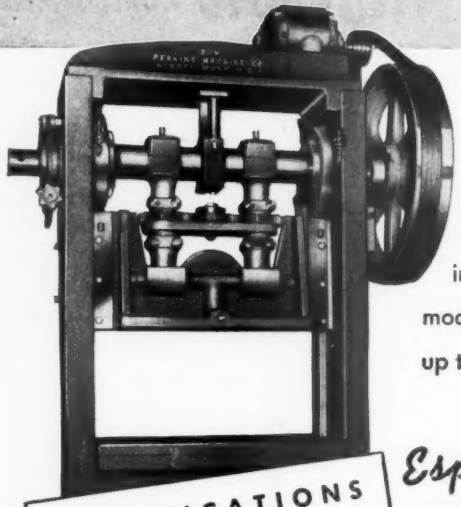
◆

The duties of L. A. Dixon, Rockwell Manufacturing Co. executive vice president, have been expanded to include jurisdiction over the Delta power tool operation. Mr. Dixon now will be responsible for the manufacture and sale of a varied and diversified line of Rockwell products.

◆

Larry A. Bard has been appointed manager of the new Shear-Speed Chemical Products Division of the Michigan Tool Co. The company is the second firm created by Michigan Tool in recent years. The first was the Cone-Drive Gear Division.

PERKINS No. 2-H
Double Crank Flywheel Press



A standard double crank, straight side press at a surprisingly low price. This model press built in sizes up to 200 tons capacity.

SPECIFICATIONS
Bed area ..... 18 x 30"
Capacity ..... 20 tons
Wheel ..... 28" diam. x 350 lbs.
Strokes.....as required by customer
Distance, bed to ways.....14 to 16"
Speeds ..... 70 to 200 rpm

Especially suited for dies requiring large bed areas

PRESSES BUILT TO SPECIAL SPECIFICATIONS

Perkins Power Presses SINCE 1885

PERKINS MACHINE CO.
WARREN, MASSACHUSETTS

. . . . . MEN YOU SHOULD KNOW

Charles J. Linduska

Howard W. Carlisle

W. W. Hurtt

George C. Somes

Paul Gray

Clearing Machine Corp., has appointed Charles J. Linduska and Howard W. Carlisle as assistants to Sales Manager E. J. Cunningham. Mr. Linduska has been with Clearing since 1936. He will be responsible for the firm's pricing policy. Mr. Carlisle, associated with Clearing since 1940, will be assigned to the field sales organization.

◆

W. W. Hurtt, formerly chief of preliminary design at TEMCO Aircraft Corp., has been promoted to assistant chief engineer of design. A native of Wichita, Kansas, Mr. Hurtt came to TEMCO from Beach Aircraft Corp., where he served for 12 years, first as a design engineer and later as a preliminary design engineer.

◆

George C. Somes, Jr., manager since 1944 of the New York City sales territory for Standard Pressed Steel Co., has been named to the newly created post of manager of sales promotion and merchandising for SPS. Mr. Somes, a veteran of 20 years at SPS will be in charge of the firm's training courses.

◆

West coast representative in the sale of Pullmax sheet metal working machines and Cader Flame Cutting machines for American Pullmax Co., Inc., is Paul Gray, a graduate of the U. S. Maritime Academy and former marine engineer for United States Lines. Gray, more recently, has been associated with Jones & Cowing and Wood and Cies.

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- FINER FINISH
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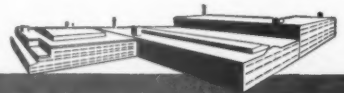
FREE EXPERIMENTAL SERVICE

Hupp's experimental laboratory is at your service. Send samples of parts to be processed and finished part. Hupp will analyze your finishing needs and make cost-saving recommendations. No charge or obligation. Write Today.



HUPP CORPORATION

GLOBE STAMPING DIVISION

1250 WEST 76th STREET CLEVELAND 2, OHIO

. . . Straight-Side Press, from page 111

for the right job, in the straight-side category, tonnage again enters into the picture very heavily. A little more emphasis can be made on off-the-bottom-of-the-stroke tonnages, because of the longer strokes involved.

The greatest hazard to straight-side press equipment is the tonnage factor. A lot of people figure tonnages on jobs, and they don't realize how rapidly the capacity of the machine drops off, off the bottom of the stroke.

After the tonnage is straightened out, there is another problem that enters into it; whether or not the machine is to be single or double geared, that is, connected directly with the drawing speeds that can work the metal, and which in turn is tied in with the length of stroke. There again the velocities off the bottom of the stroke must be considered.

That also brings up another very important point. That is whether or not a single end or a twin drive is needed on the crankshaft. As is well known, the addition of twin drive to a straight-side machine increases the off-the-bottom-of-the-stroke tonnages approximately 50 per cent.

The next problem is determining the type of cushion. There are many types of cushions available, particularly on the double crank machines. There is as much that goes in the bed of the press as in the crown. There again is another spot that people brush over too lightly. This does not get the proper consideration. A lot of people don't realize what is available in the bed of the press.

Unless you can properly define the following terms and know what the advantages and disadvantages are, you should definitely determine their meaning:

Single gear.
Double gear.
Single end drive.
Twin drive.

Then, going into the cushions —single deck cushion and double deck cushion.

A blocking device.

What is the difference between an individaul pressure pad and a common pressure pad?

What is the cushion stool?

These items are all very important, and any press manufacturer will have to know the requirements in order to build the proper press. It is true that a lot of times the job is sent in and the press manufacturer himself takes these factors into consideration, but to give the proper consideration in the selection of a straight-side press the purchaser should know what these terms are and what is back of them.

After the conclusion of the foregoing discussions the PMI panel meeting was thrown open to questions from the audience with informal answers by the discussion leaders. These are presented on the following pages as transcribed from stenographic notes. E. W. P.

QUESTION: "In an OBI press, which type would have the least amount of deflection, the cast frame or welded frame press? Why are most OBI presses cast frame?"

ANSWER: (Mr. Saul) "I will take the last question first. I

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At SEVERANCE, New-Tool Craftsmen, using the same precise skill and care that they do in grinding new tools, regrind your cutters. Send in your dull cutters today!

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SAGINAW, MICHIGAN

OUR COMPLETE CATALOG IS YOURS FOR THE ASKING! IT INCLUDES LOW REGRINDING PRICES.

think that the reason that most of them are cast frame is because they started making them that way. They started off as standard presses. They set up their patterns accordingly. They produce them by the dozen, it has been the thing to do, and they were making them long before press frames of any type were welded. So I think that is the reason so many builders got started making cast frames, because it was the thing to do, the practical thing to do.

"As to the matter of deflection, I think that is anybody's guess, and that is not trying to avoid a very practical question either. It depends entirely on what you have in the frame, whether it is cast or welded. Either one can be made to take its rated tonnage within the allowable deflection, and I don't see any means of readily answering that, as a direct question, because there are many variables involved.

"The cast frame has some advantages, the first being that it usually carries more weight and will be a more stable machine, but that is not dispensing with any of the advantages that the welded frame might have in being a tougher frame. It isn't going to break, although it can be taken out of line. If you overload, either frame is going to fail if you keep at it long enough."

ANSWER: (Mr. Morris) "I would like to make a statement on that. I think a great deal has to do with how the press is designed. If you need a tremendous amount of damping forces you get them in the cast press, which you usually cannot in the welded press. Furthermore, assuming that both presses are properly designed and one is as good as the other, you would have economical reasons for building cast machines, where you have a number of machines to build. You start out with one homogeneous mass of material, and I think that is quite important from the economical standpoint of what you can get for your money."

QUESTION: "Should a 60-ton press be figured for a 60-ton job? If not, what percentage would be considered as a safety factor in determining the press capacity?"

ANSWER: (Mr. Saul) "The thing to do, in figuring a press, is to figure the press over-size for the job, because it is the safest thing from the standpoint of maintenance, and you will cut your deflection down, regardless of the type of press. You get longer periods between reworking the tools, and you have an added safety factor against down time. As you all know, down time is the most expensive part of any breakdown. It isn't replacement or damage to your dies or anything of the sort. It is production loss. For a job which would figure 60 tons, at least a safe margin there would be a 75-ton press, I would think."

ANSWER: (Mr. Sommer) "May I comment on that? I would like to add that the question of where the 60 tons are going to be taken, i.e., ¼ inch from the bottom of the stroke or 3 inches from the bottom, plays an important part in overloading the driving members, the torquing members of your press."

. . . *Continued on page 121*

FRAY VERSATILITY
MOVES WORK FASTER!
Fray
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UNIVERSAL RAM • TURRET TYPE • VERTICAL & HORIZONTAL
MILLING MACHINE
Speed up production by cutting job transfers with the versatile Fray 10-RH. This all-purpose milling machine performs an unequalled range of operations, cuts idle machine time and produces more work per man hour. It machines at any angle—vertical, horizontal or both. It mills, drills or bores at any angle. On any single piece of precision work requiring a variety of operations it is easier to reset the Fray than to transfer the work. For faster jobs, done better at less cost—investigate the easy to operate Fray 10-RH. A High Precision Tool.
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For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.
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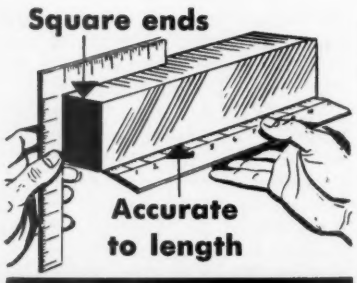

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Triple-Chip METHOD — REMEMBER — IT'S THE COST PER CUT THAT COUNTS! — Only M & M builds ALL 3: CIRCULAR SAW BLADES GRINDERS

Sharp Upswing in Shell Molding is Forecast

A marked upswing in production of phenolic resin for the foundry industry's shell molding process, that will continue through and beyond 1957, has been forecast by the nation's leading manufacturer of this product.

Robert K. Mueller, general manager of Monsanto Chemical Company's Plastics Division, estimates that recent revolutionary developments in casting procedures virtually assures an eventual industry-wide production volume in phenolic resins that will be nearly 17 times 1952 figures. Resins used in the shell mold process have more than doubled each year since their first major use in 1950, and now are produced at a rate of several million pounds annually. The plastic is used to bond a new, thin, strong, sand shell for castings that means substantial savings in capital investment, floor space, machining or finishing, and sand handling as well as greater precision in casting. "The universal appeal of the shell mold development is indicated by its growing use in both large and small foundries," Mueller said. Two of the largest foundries in the world have adapted operations to it.

While the percentage of the total number of foundries that have installed shell molding machines is small, the success of the process is clearly demonstrated by the backlog of orders for equipment. Orders cannot be filled by machinery manufacturers for three to six months. It must be remembered that very few shell molding machines were in operation in 1951. Last year showed a sharp growth with 20 foundries in actual production and more than 100 beyond the development stage but forced to wait for machines or patterns.

Probably a better measurement of the 1952 expansion would be the number of molding stations in operation. Most shell molding units are multiple station machines, varying from two to 24. Approximately 300 stations were making shells for castings last year. By the end of 1953, the number of stations should be three times those in operation today.

Early beliefs that the size and weight of parts would be a limiting factor in the application of shell molding have been shattered. A 300-pound casting for railroad use has been cast successfully by one foundry. Another is using the shell mold process to cast 175-pound parts regularly. And the vast quantities of tiny metal products now cast in sand and resin shells cannot be ignored.

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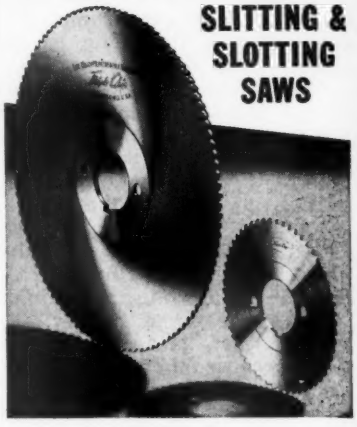

The Motch & Merryweather Triple-Chip Method clears the way to faster results in milling operations. Alternately ground paired high and low blade teeth form curling, self-clearing chips which relieve stresses and minimize breakage. Saws produce more work and more accurate work and "live longer".

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* * *

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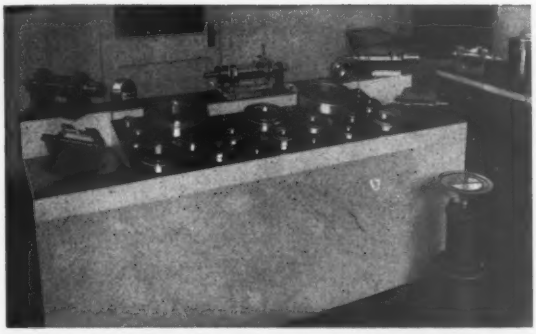

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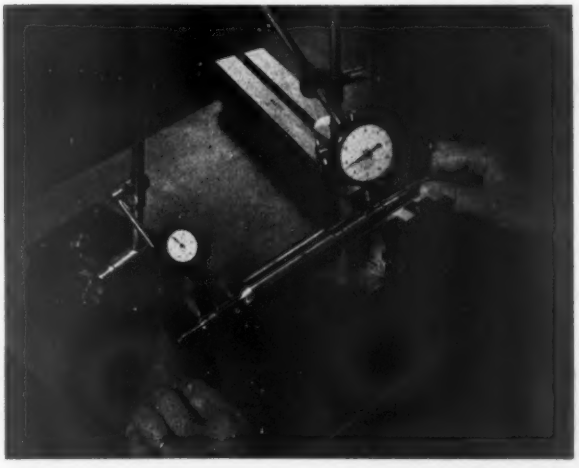

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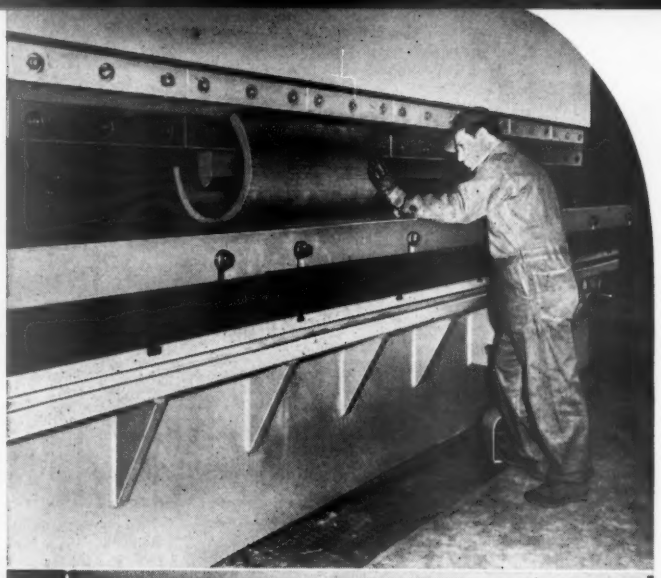

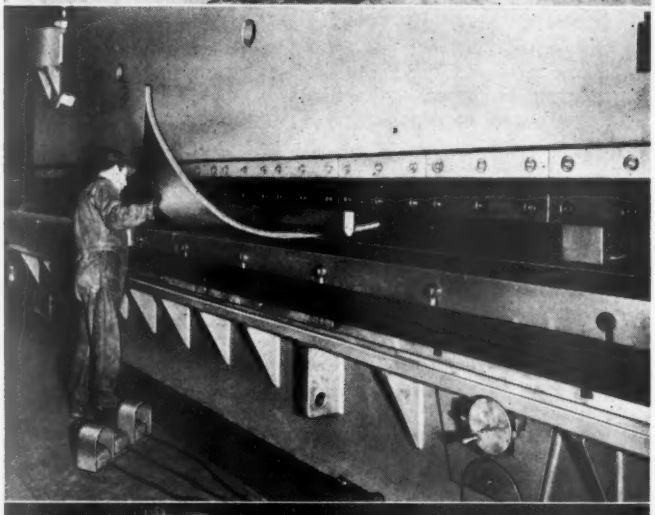

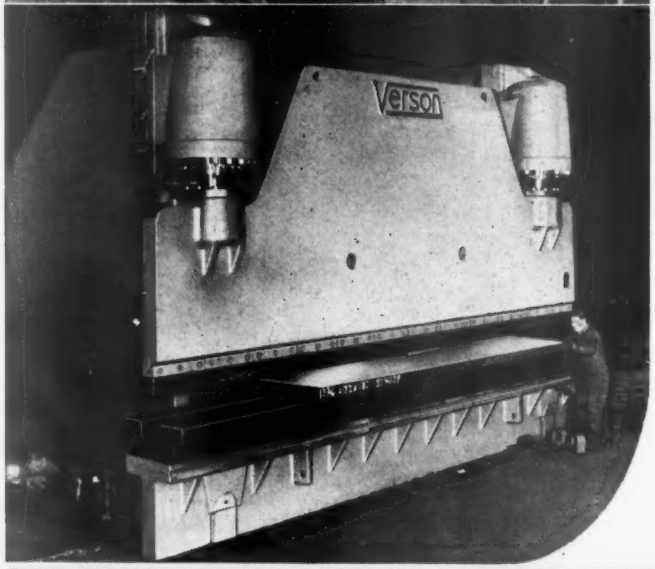

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(center) **A 1¼" plate, 4 ft. long being shaped into a segment of a 30" cylinder. The only other way this job can be done is by small sections of flat plate welded together. A long, difficult, as well as costly fabrication.**

(bottom) **An over-all view of our brake showing its immense size. A 3¾x72x180" plate is being straightened.**

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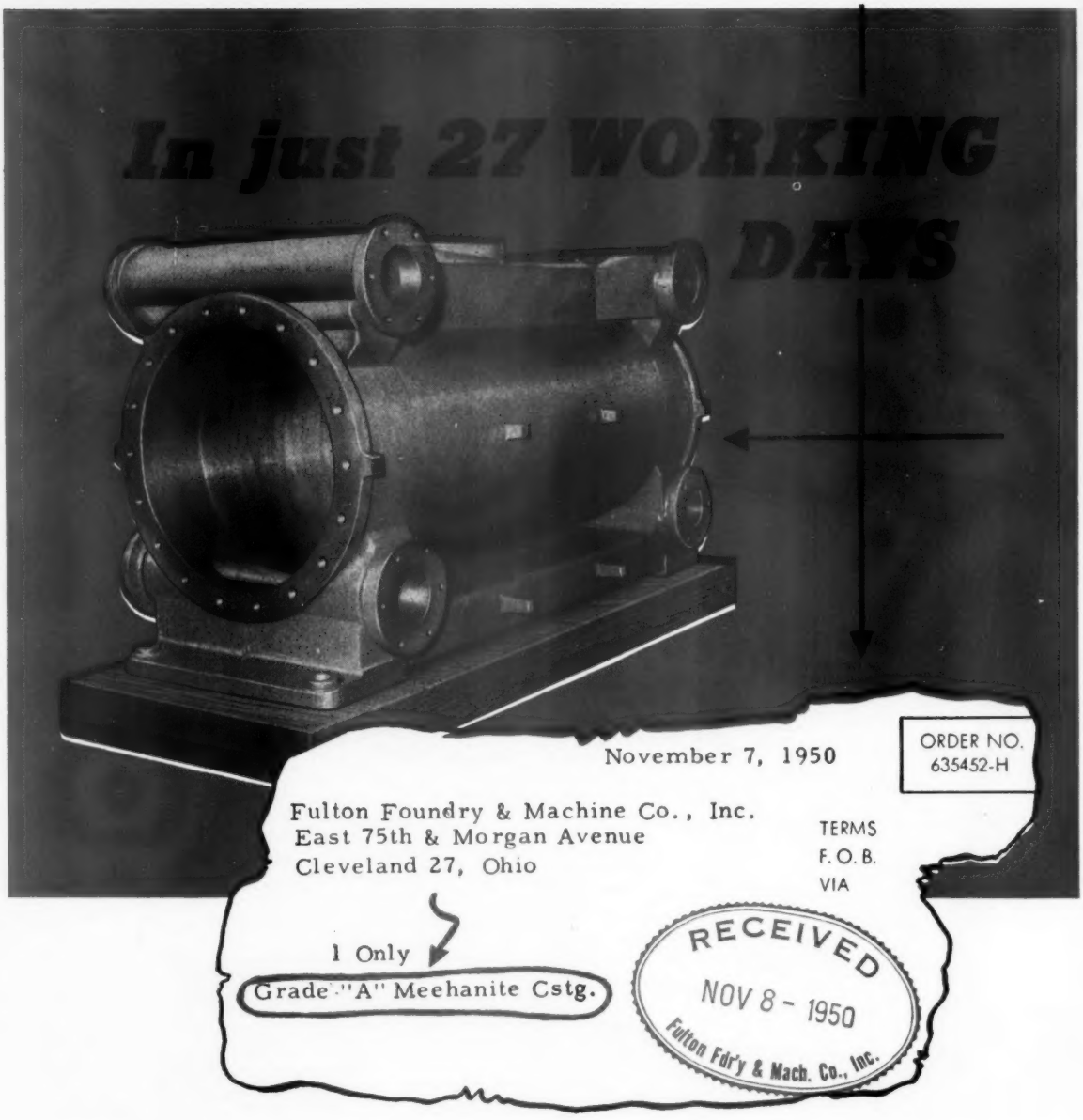

THIS 30" x 60" High Pressure Steam Mill Engine cylinder weighing nearly 5 tons was cast and machined in just 27 days and shipped to a large steel producer. Just another outstanding example of Fulton's unusual Jobbing Foundry and Machine Shop facilities for hurry up calls on breakdown work.

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BLUE CHIP DRILL BLANKS are the Tungsten Type, hardened and finished ground. They are available in sizes from 1/16" to 1" in diameter and from 4" to 5" in length.

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This widely known and time-tested FIRTH STERLING line is now immediately available from stock at THE SPANGLE SUPPLY COMPANY.

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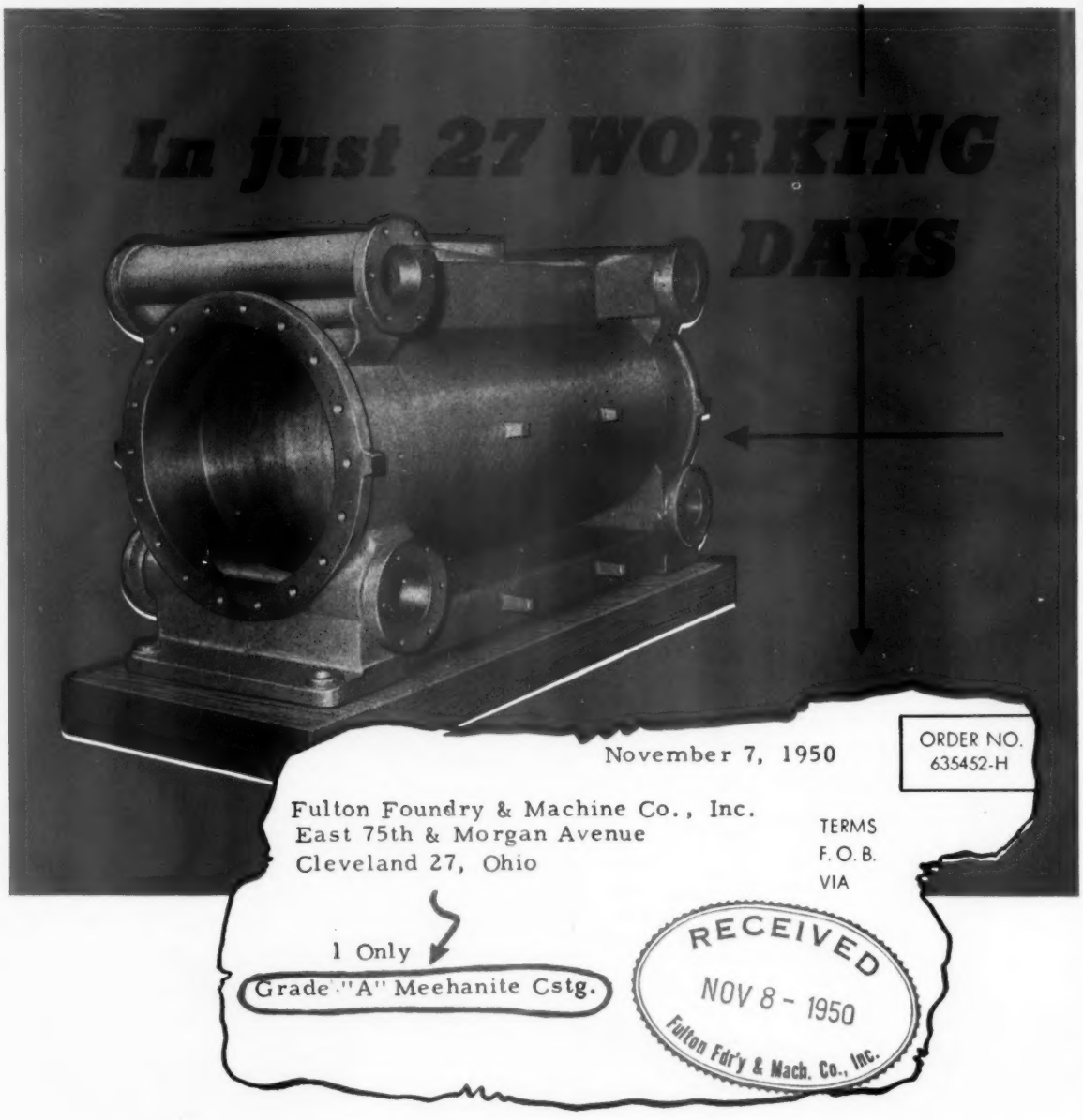

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CLEVELAND ENGINEERING SOCIETY ELECTS OFFICERS

Ralph R. West, president of West Steel Casting Co., was elected president of the Cleveland Engineering Society at a special session of the Board of Governors recently.

West, a member of the Board for the past three years, becomes the Society's 70th president and will head up the local engineering organization for the 1953-54 season. Succeeding Harry Gellin, president of the Gellin Co., West will be installed in office at the Society's Annual Meeting to be held Tuesday, June 9.

Other men elected to office include: First Vice President, William R. Spiller, vice president, Harris-Seybold Co.; Second Vice President, Max B. Robinson, Dean of Co-operative Education, Fenn College; Treasurer, Irwin L. Seidel, supervising engineer of field operations, Cleveland Electric Illuminating Co.; and Executive Secretary, Mary C. Manwell.

Three new members will join the Board of Governors at the same time as the installation of the executive officers. They are: Willard C. Brown, manager of application engineering department, Lamp Division, General Electric Co.; A. T. Colwell, vice president, Thompson Products, Inc.; and William R. Hough, engineering vice president, Reliance Electric & Engineering Co.

Present members of the Board include: Dana H. Bailey, Harris Calorific Co.; Franklin Gepfert, Black Drill Co.; Max B. Robinson, Fenn College; Irwin L. Seidel, Illuminating Co.; C. A. Butler, Jr., Diamond Alkali Co.; Warren H. Chase, Ohio Bell Telephone Co.; Harry Gellin, Gellin Co.; and William R. Spiller, Harris-Seybold Co.

President-Elect West has been an Active member of the Cleveland Engineering Society for the past 23 years. Over the years his activities in the Society have included almost all committees and a number of the Divisions.

This year he has served as a member of the Board of Governors, vice chairman of the Publications Committee, a member of the Tuesday Noon Luncheon Committee and the Entertainment Committee.

Outside affiliations include Smaller Business of America, of which he is a past president, and the American Society of Metals. Last year he was a member of a government foundry team counselling French foundrymen and spent six months in Paris on this assignment.

Industry News

James F. Hetz has been appointed a sales representative in the Ohio territory for the Park Chemical Company, Detroit manufacturers of heat treating materials. The announcement was made by R. N. Lynch, Sales Manager of Park's industrial division.

Mr. Hetz will make his headquarters in Cincinnati, Ohio.

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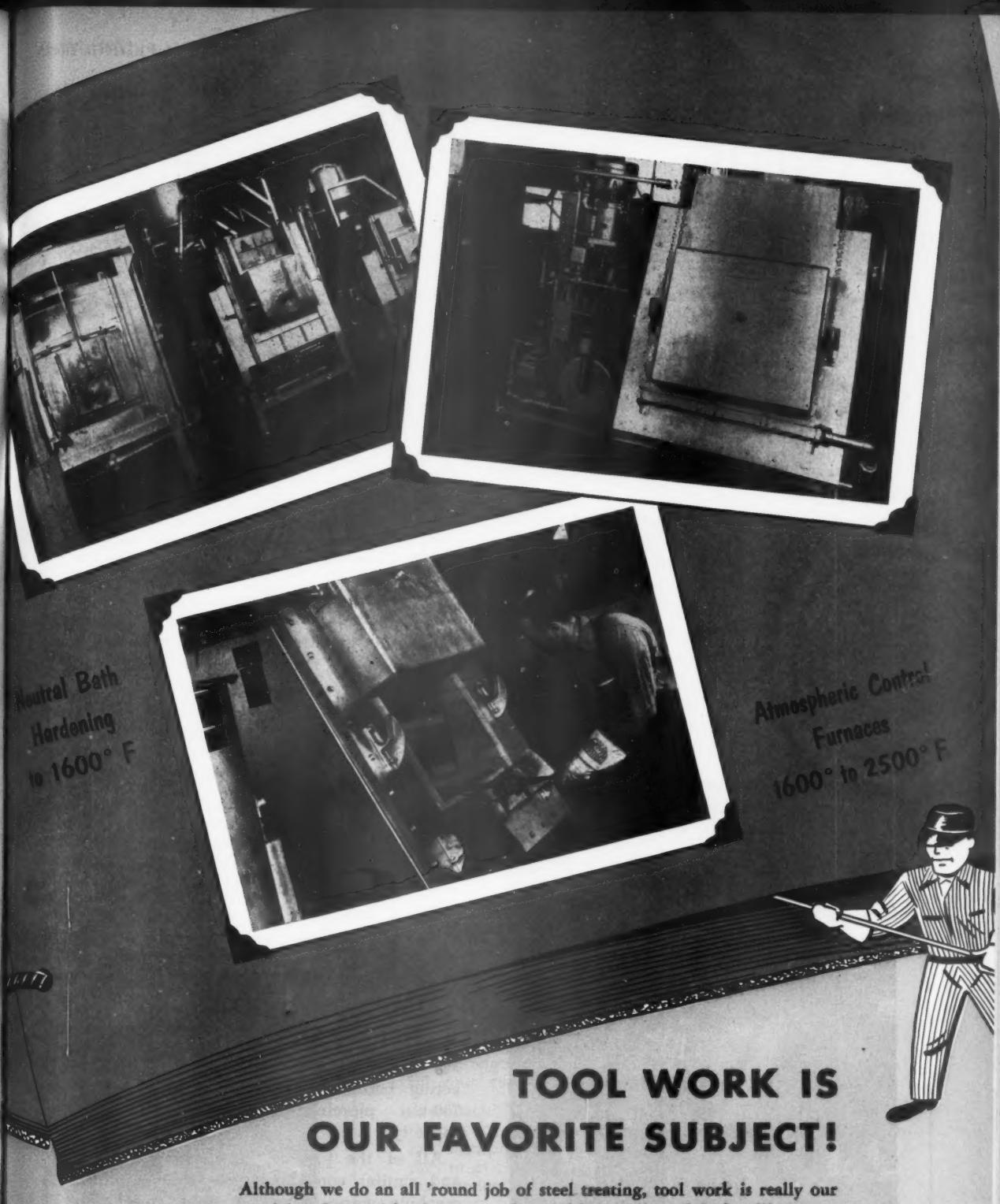

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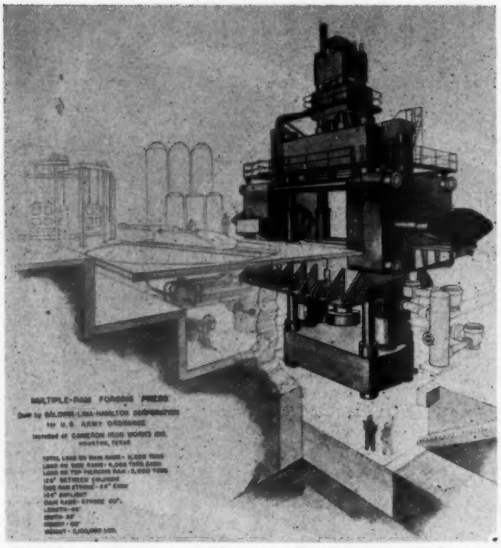
11,000-Ton Split-Die Forging Press

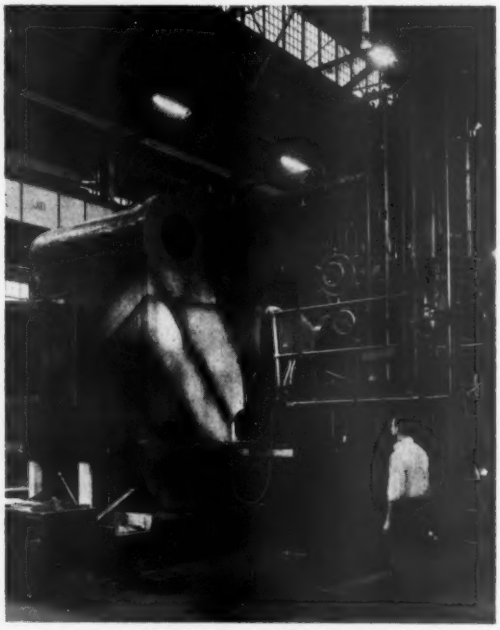
The largest split-die forging press in the world is under construction in the Southwark shops of Baldwin-Lima-Hamilton Corp. for the U. S. Army Ordnance. Upon completion, the press will be installed in the Houston, Texas plant of Cameron Iron Works, Inc. The 60′ tall multiple-ram press will stand in a 40′ pit.

The new press, with a capacity of 11,000 tons, will be equipped with a piercing ram at the top and a knockout ram at the bottom. Two horizontal side rams will be used for clamping vertically split dies, or for piercing when using horizontally split dies. With a bolster area of 10′ x 10′, the press will have a maximum vertical opening of 12′ and maximum horizontal clearance between side-ram faces of 15½′.

Split-die forging capacity at Cameron Iron Works will be greatly increased by the addition of this new larger press. Cameron pioneered in this field many years ago, when they installed the first press built for split-die work. By this process, intricate shapes and forms—otherwise produced only by casting—can be successfully forged. Closed split dies permit practically no draft on forgings, and there is little or no flashing to be removed from the rough part.



Artist's conception of the completed press, with cutaway view to show foundation construction and lower details of press design.



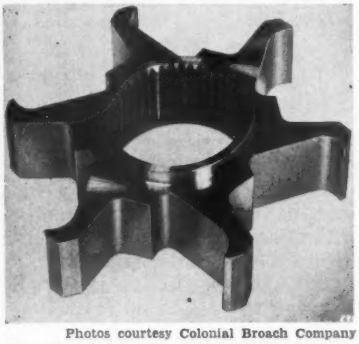
Massive top platen being machined on a horizontal boring mill. The platen, weighing about 297,000 lbs., is of welded steel plate construction, with cast-steel column husks welded integrally into the platen.

Main pull-down capacity of the hydraulically-operated press will be supplied by two 51″ dia., 60″ stroke, single-acting cylinders of 5500 tons each. Two 18½″ cylinders, with a net stripping capacity of 300 tons, will be used as pullbacks. The two 48″ side-ram cylinders have a stroke of 24″ and a capacity of 6000 tons. Two pullback cylinders on each side have a combined capacity of 500 tons. Top piercing capacity of 3000 tons is furnished by a single 38″ cylinder, having a 24″ stroke. Two pullback cylinders will supply 300 tons net stripping capacity. A double-acting bottom piercing cylinder will have 750-ton piercing and 280-ton pullback capacity.

All of the platens, base, check sections, and similar components for this mammoth machine were fabricated from steel plate, some of which are 6½″ thick. Before welding, it was necessary to preheat the plates with gas torches. After assembly of each part, complete with bracing plates, column husks, etc., it was placed in an immense heat treating furnace for stress relieving.

Spider Arms Broached on Single Ram

A combination manual and automatic control setup has been developed which permits the broaching of aircraft engine spiders on standard single ram broaching machines.



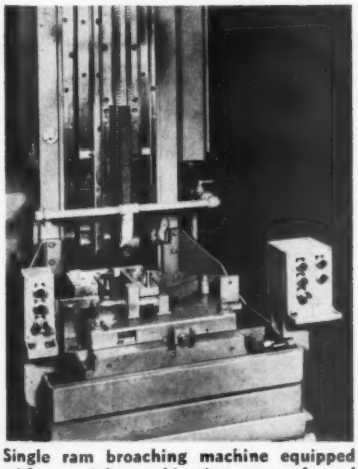
Photos courtesy Colonial Broach Company

Aircraft engine spider. Contours on arms are broached on single ram in six passes.

The machine shown is a 6-ton, 54 in. stroke single ram, used to broach six identical contours on the six arms of an aircraft spider.

In operation, the spider is placed in the fixture and clamped in place manually, locating from the splined hole. Each cutting stroke of the broach broaches the contours between one set of arms on the spider. When the circuit is actuated to start the broaching cycle, support jacks in the fixture automatically close in and support the two arms of the

. . . *Continued on page 116.10*



Single ram broaching machine equipped with special combination manual and automatic fixture for broaching arms on aircraft engine spider.

Baumbach Patented Self-Sizing Rite-Fit Dowel Pins.
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Ground Machined Steel Plates and Discs. We furnish plates and discs in any size or shape cut to your requirements in thicknesses from ⅛" to 6". We Blanchard Grind up to 84" diameter.
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. . . Spider Arms, from page 116.9

spider opposite the surfaces being broached. When the broach has completed the cut, the fixture automatically shuttles clear of the broach and the automatic support jacks are released. This allows the operator — while the broach is returning — to manually unclamp the part and index it in the fixture to the next position for broaching the adjoining set of contours. Then the cycle is repeated until all six contours between the six arms of the spider have been broached.

Change Of Name

The Gilbert S. Simonski Company, Neshaminy, Pennsylvania, makers of Lucifer Electric Furnaces, announces a change in name, effective June first, 1953, to Lucifer Furnaces, Inc., same address.

Founded in 1943 by the late Gilbert S. Simonski of Philadelphia, the firm designs and builds electric furnaces for heat treating purposes. Production capacity will be boosted as soon as plant expansion is completed.

ASA Diamond Project

More effective use of industrial diamonds as a vital element in defense production is the objective of a new project to be started soon under the procedure of the American Standards Association.

This was announced by Vice Admiral G. F. Hussey, Jr., managing director of the ASA, following a general conference of interested groups which recommended the new standardization project. Tool engineers, the diamond trade, machine tool builders, industries using diamond tools, engineering societies, and Armed Forces, were represented.

The new project aims at interchangeability of diamond tools and their holders. The conference defined a "diamond tool" as the combination of a diamond and the "nib" or "shank" directly carrying it. A "holder" was defined as the fixture holding the diamond tool in the machine with which it is used.

"Such a large variety of diamond tools and holders have been developed over the years that there is no interchangeability between these parts", Admiral Hussey said. "The new ASA project is expected to remedy this situation and eliminate the present necessity of stocking a large number of different replacement parts.

"The scope of the work to be undertaken was tentatively defined to cover terminology and definitions applying to loose diamonds and diamond tools, and dimensions of diamond tools and tool holding accessories.

"Industrial diamonds play an important part in mass production, and their conservation is essential if industry is to continue without disruptive delays. They are used as cutting tools, for example, in turning and boring operations, and also in devices for truing and dressing abrasive wheels to restore their effective performance".

The American Society of Tool Engineers, which requested the ASA to consider the problem, offered to assume the administrative responsibility as sponsor for a project to be initiated under ASA procedure. The Industrial Diamond Association of America, trade association of the suppliers, agreed to join in this responsibility. The conference recommended that the two organizations be invited to accept joint sponsorship of the project and organize a technical committee to develop standards in this field.

Organizations represented at the General Conference were: American Society of Mechanical Engineers; American Society for Testing Materials; American Society of Tool Engineers; Automobile Manufacturers Association; Industrial Diamond Association of America; National Machine Tool Builders Association; U. S. Department of the Air Force.

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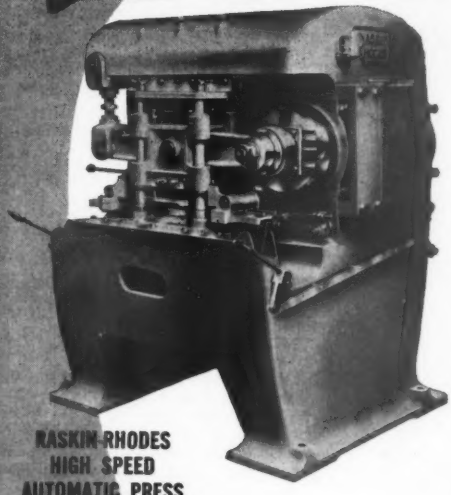
22 tons to 132 tons capacity.



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11 tons to 55 tons.

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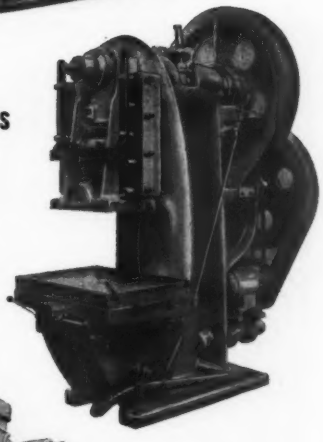
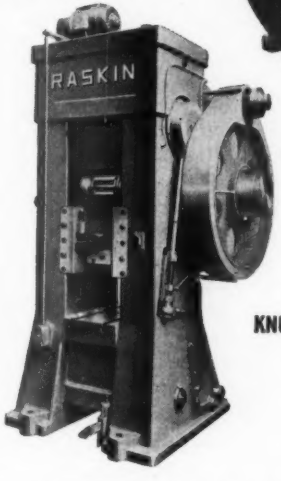
- Extra long gibs assure longer die life.
- Protected from overload by shear pins in the clutch.





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PRESCRIPTIONS FOR PRODUCTION

. . . put up by W. N. ("Doc") Nordquist, Technical Editor

Template-routing and milling of heavy aluminum plate or of stacked aluminum sheets is done quickly, easily with specially designed contour machine that features a hydraulically-powered over-arm with independently-driven router bit. The most intricate template contours, one or many openings, are easily followed with the router head.

Successive secondary press operations on small stampings are done faster, without intermediate handling, by using hopper-fed dial feed tables on modified standard punch press. At least one press builder will now "engineer" the complete package to do a series of operations formerly requiring several machines.

Light, bulky work in the press shop often ties up presses designed specifically for much heavier work. A 35-ton press with 10″ shut height, 6″ stroke, 21″ x 33″ bolster, 24″ x 8½″ ram face, and 11½″ throat depth will take much of this "nuisance" work that can't be done on smaller presses but still does not justify big, heavy equipment.

At least one manufacturer is now offering a high-red-hardness h.s.s. band saw blade in various tempers for production cut-off operation on stainless steels and many of the newer "hard-to-machine" alloys.

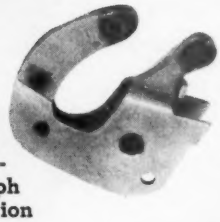
The press shop of a large electrical manufacturer had for many years "enjoyed" once-a-shift hand lubrication of punch presses, also enjoyed 18 minutes of downtime per shift per press, also enjoyed semi-annual reconditioning of machine slideways. Introduction of Lincoln automatic centralized lubrication on 40 punch presses has virtually eliminated downtime, bearing failure, and way reconditioning.

Aluminum and magnesium die castings are now being made—without flash—in a machine that introduces a new concept of pressure packing the metal in the molds. For "cold chamber" injection molding, the machine provides an exceptionally high final closing and locking pressure that ensures sound castings free from excessive porosity.

In the shipment of complex assemblies that have many delicate parts and fine adjustments, an added safeguard against the danger of accidental shock can be provided by the use of a non-linear shock and vibration isolator. The mount absorbs small vibrations with little deflection or movement of the equipment. At high shock loadings, the mount serves as a soft cushion absorbing the energy of impact and returning the equipment unharmed to its original position. Units come in a wide range of sizes and load ratings.

Unit cam assemblies for an imported automatic screw machine can be set up for the next job while one job is still being run. When a job terminates, the cam assembly is removed from machine and the new pre-selected and assembled unit is quickly and easily inserted.

DESIGNEERED*



HOW would you finish the internal form on the special latch illustrated in photograph at a high production rate?

WHEN our customer asked us for equipment for finishing the internal form of the special latch illustrated the ACME single slide surface machine proved the perfect answer. By using inexpensive "Designeered"* tooling, highly satisfactory results were obtained.

ACME manufactures ALL TYPES of broaching machines and allied equipment under the supervision of men in this field since the inception of the process!

Shown above is the ACME six ton, thirty-six inch, single slide surface broaching machine.

* DESIGNEERED . . . An ABC word coined to describe the creative design-engineering inherent in every product made by Acme Broach Corp.

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MILAN, MICHIGAN

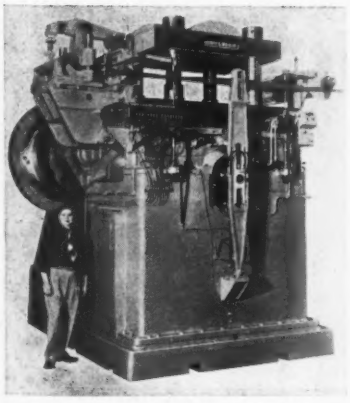
High Speed Dieing Machine

Handling metal up to 25″ wide and 11/32″ thick, a new high-speed automatic 350-ton dieing machine makes completely drawn and formed stampings by the progressive die method. The 350-ton machine, one of the largest of its type ever built, has been developed by Henry & Wright, Division of Emhart Mfg. Co., Hartford, Conn.

Up to 16″ strokes can be provided for producing straight shells up to 3⅜″ long and tapered or hemispherical shells of greater lengths. Only one operator is required.

Two of the big machines have recently been delivered to automotive firms. The first automotive machine makes right and left hand parts for an automotive window control gear housing at the rate of 60 complete pairs per minute. The machine produces the more economical metal stampings as a replacement for a zinc casting.

The second 350-tonner is being used to produce major components for the automatic transmission of a popular car. Standard equipment on this machine includes an adjustable scrap cutter and Henry & Wright's precision roll feeds to accommodate 25-inch wide steel. It operates at speeds up to 60 strokes per minute.



Replacement of castings with the more economical metal stampings is possible with this 350-ton automatic dieing machine. Two of these machines have been sold to firms in the automotive industry. An idea of the size of the machine can be gained by comparing it to the man at the left.

The machine is equipped with pneumatic draw cushions mounted on the top side of the upper crosshead. These pneumatic cushions hold the sheet firmly on the face of the die, to prevent wrinkling during the drawing operation.

Precision alignment of the tools is provided by the unique construction employed. In the dieing machine any angular thrust from the crankshaft and connection is absorbed by the lower crosshead instead of the punch-carrying member as is the case in conventional overhead crankshaft presses.

Maximum guidance control is given to the machine's crosshead by use of long ways which are rigidly keyed in the lower base. In this way, precise alignment of tools is provided throughout the stroke, even under severely eccentric loading.

For complete details write Henry & Wright, Div. of Emhart Mfg. Co., Hartford, Conn., or **Circle Inform-A-Gram No. D5.**

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N.T.D.M.A. Reports Increase in Special Tooling for Consumer Products

A warning note to defense planners to keep the special tooling industry healthy was sounded by J. J. Demuth, of St. Louis, former president of the American Society of Tool Engineers and tool and die consultant to the National Production Authority, at the annual trustees meeting of the National Tool & Die Manufacturers Association here. "Let's not again forget that this country will never be any stronger than our ability to produce special tooling fast for end products required in the event of war. Atomic energy, radar and jet engines are so complex that we can't afford to build back for any length of time and hope to get into mass production quickly. Without active tooling facilities, the biggest reserve of machine tools would be useless."

A marked decrease in armament tooling requirements and a corresponding upsurge in special tooling for civilian products was reported by the NTDMA trustees. From a ratio of 80 percent defense and 20 percent civilian tooling early in March, the average in tool and die shops throughout the country, as of the end of April, was 40 percent defense and 60 percent civilian. Areas like Detroit, Cincinnati, Providence and Milwaukee reported civilian tooling particularly heavy, with armament requirements below 25 percent.

Whatever slack is resulting from the drop in defense tooling is presently being offset by the stepped-up pace of tooling for new consumer products, according to Philip R. Marsilius, vice-president of The Producto Machine Company, Bridgeport. He predicted intensive design competition by manufacturers during the latter part of 1953 and throughout 1954.

"New tooling orders flowing into contract tool and die shops indicate that automotive, household appliance and business machine producers will be vying for the consumer dollar with products that are newer, better and cheaper," he said. "The productive capacity in consumer industries is now abundant and with the freeing of materials, there is only one road open for them—hard selling of modern designs. They recognize that standing still will get them nowhere."

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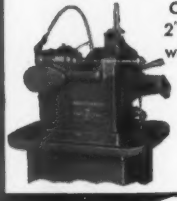
For the generation of spur gears and pinions only.

Capacity: 2" O.D. of workpiece.



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Hobs spur and spiral gears, worm gears and worms (to three thread), splined shafts, gear sectors, and pinions.

Capacity: 6" O.D. of workpiece.

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Exclusive Greater range of hob spindle speeds: 109 to 1259 R.P.M. — 12 speeds.

Exclusive Speed, feed, indexing. *Each can be selected independently.* This, and wide range of hob speeds, adds flexibility; reduces set-up time; gives quick selection of speed and feed to suit material and gear size.

Exclusive Alignment and trueness of work and hob spindles are held to within .0002".

Exclusive Generates gears from 3 teeth to 1200 teeth.

Exclusive Accumulative error of not more than .0002" guaranteed.

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. . . Press Questions, from page 115

ANSWER: (Mr. Sherman) "I would like to make a comment on that. Some of the tool designers and press users, in figuring the capacity of the press, just figure the load when the die is sharp. We all know that as the die becomes dull the pressure increases. The pressure may go up 15 or 20 per cent, depending upon just how much the inspection department will buy in the way of burr. Some of these jobs that you pick up certainly go to 15 per cent and even 20 per cent over.

"I think in laminations the tendency seems to be with most of the motor manufacturers to pull the dies when the burr has reached .005, and the die data that we have shows that that runs around an additional 10 per cent over the blanking load.

"The question of how much in excess you should use in purchasing a press or a dieing machine is a matter of economics. We all know that if you put a 50-ton blanking job in a 100-ton machine you are going to get more die life than you are going to get in the 50-ton, but on the other hand you are also going to pay more money to provide that additional capacity."

QUESTION: "What are the basic differences between a press brake and punch press, price, and so forth?"

ANSWER: (Mr. Verson) "As to price, it depends primarily on the particular size you are considering. Let's consider, say, a 60-ton machine, that would be equipped with a wide bed and a wide ram, so that it could be compared to a punch press. Let's take a basic machine of 60 tons capacity, 8 feet, 6 inches between housings. To this machine we will add a removable bed flange and a removable ram flange. This will give you a bed area of approximately 22 inches by 90 inches. To this let's also add an electric clutch control and air counterbalance. This machine operates at 35 strokes per minute, has a 3-inch stroke and a 12-inch shut-height. This machine would cost approximately $5500 to $6000.

"I might also add that by using a removable bed flange and a removable ram flange it is possible to remove these items and still use the machine as a standard press brake for standard bending work."

QUESTION: "Why not use press brakes rather than punch presses, or how do you determine that the press brake will do the job rather than a punch press?"

ANSWER: (Mr. Verson) "There let me make the assumption that the writer of the question is thinking primarily of punching and shallow forming work. That type of job can be run successfully in a press or a press brake. With the press brake you get a considerably longer bed than you do in the average small punch press. Therefore, you have a possibility of combining two or three operations in the same machine, provided of course that the machine has sufficient tonnage capacity.

"They can be used more or less interchangeably within limits that are not too well defined and depend primarily on the type of job to be done."

QUESTION: "Give examples of jobs that need single, double, back gear drives."

ANSWER: (Mr. Dunlap) "A good example of a job requiring a single geared drive on, let's say, a double-crank straight-side press would be a

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SAF-T-RAIL — Guard rail fits either top or middle table.
ROLLER CONVEYOR TOP • RUBBER TIRED WHEELS

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heavy blanking job. I am talking about blanking 7/16 or ½ inch material. The primary reason for doing it on the single-geared machine would be to be able to build up the flywheel energy required to do the work. You are using the flywheel over a relatively small amount of time in relation to the rotation of the crankshaft, and consequently the single gear would be ample.

"When you have a deep part that requires a considerable amount of force over a longer period of crankshaft rotation, it is necessary to go to a double gear in order to provide the desired or required amount of flywheel energy.

"You understand that the maximum pressures that you are dealing with are not necessarily greater, but you have the time element entering into it; that is, the amount of time you are applying these pressures. So if you get into deep draw work, where you are flowing metal over a longer period of time, it is necessary to go to the back gear drive.

"Another thing that controls that is the length of stroke. In order to get the most out of the weight of your flywheel, it is necessary to revolve it at least 350 r.p.m. Consequently, if you have a machine that is only running 12 strokes per minute or so, you have got to have a considerably greater gear ratio, in order to keep your flywheel speeds up, which will consequently give you the energy required."

QUESTION: "Can a double-action press be used for coining or restriking successfully?"

ANSWER: (Mr. Sommer) "My answer would be, no. It would be more likely a knuckle-joint press or a single-action press.

QUESTION: "What is the minimum production required in order to run a job in a dieing machine?"

ANSWER: (Mr. Sherman) "Back before the lean years of the 1930's, we used to think that the quantity should be around 100,000 as a minimum, but data we have accumulated over the years show that when a job is produced in quantities of 25,000 up, it can be produced by the progressive method in the dieing machine. We have one user who goes down to 5000 because the work involves six or seven or eight operations, and his claim is that the setup time is more than compensated for in the extra routing, the extra inspection, and in work waiting to get into some other press if he went ahead and produced it in the conventional single-operation method."

QUESTION: "What is the drag-link motion?"

ANSWER: (Mr. Morse) "A good many years ago—I presume it was previous to 1914—a very good engineer of the Bliss Company came out with what it termed drag-link motion. In other words, he conceived the idea from an old-time slotter, whereby he would get a slow movement downward and a very rapid movement upward.

"We have sold, I presume, 400 or 500 presses that have had what you call drag-link or slow down motion. We have made them both on single length drives and double drives,

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BOTH WET AND DRY MODELS

SPECIFICATIONS—MODEL J

Capacity—10" rounds, 18" flats
Motor—½ H.P. Ball Bearing any voltage available, single or polyphase (¾ H.P. on wet machine).
Wheel Diameters—16".
Floor Space—66" x 31".
Bed—11" wide, 44" long, 6" deep, 24" high.
Overall Height (Closed)—39".
Blade Length—11'5" x ¾" x 032" All Standard blades of these specifications can be used.
Weight—Approximately 750 lbs. Crated 800 lbs. Boxed for export 875 lbs.
Speeds—35, 90, 130, 190 feet per minute.
Casters—Optional at slight extra cost.

MODEL B, 5" x 10" CAPACITY ALSO AVAILABLE
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ALBION, MICHIGAN

and we have made them on some single-crank toggle presses. It is a very nice contrivance and a very practical one."

QUESTION: "When the tie rods have been removed in order to overhaul the press, how tight should they be retightened?"

ANSWER: (Mr. Saul) On the inclinable press, the tie rods are an assist. They serve an entirely different purpose than in the straight-side press. They tend to prevent the opening up of the frame, and they are usually tightened — they are never heated that I know of, or at least I have never seen it done—as much as they can be, and a good practice would be to use a spacer. I have seen that done in a number of instances. It is the only way you can really pre-stress the frame on the open side to a given position.

"The value of tie rods depends a whole lot on getting the rods tightened pretty much alike, and as far as any specific tightening limitations on it, I would say, tighten them as far as you can do it with the standard size wrench on the nuts provided."

ANSWER: (Mr. Dunlap) "In installing tie rods on a gap-type press, it is a good idea to have the dial indicator there, because it is very easy to spring your frame in the other way, because your frame is not made to take the reverse stress."

QUESTION: "What is the cushion stool?"

ANSWER: (Mr. Dunlap) "Well, the cushion stool is merely a facility that is installed on top of the die cushion to get rid of slugs and scrap that are the result of perhaps a compound die. You can sometimes use your pressure pad and do a draw job and perhaps come on down and blank a hole in the bottom, and you have the problem of rejecting the scrap piece or even a part. The stool is mounted on the cushion under the bolster, and has the opening in it to clear the part that you wish to eject and usually is equipped with a small incline to take the piece out either the front or the back of the machine."

QUESTION: "Why is the flywheel on most inclinable presses on the right side?"

ANSWER: (Mr. Saul) "One way of answering that is that we make them either way, but in most cases I think, or 99 out of 100, the flywheel is on the right side. I don't know of any reason, other than that they got started making them that way years ago. As far as the choice between them, I don't know that there would be any."

QUESTION: "How much slack, in thousandths, in the main bearing, crankshaft bearings and ball joints is considered good practice?"

ANSWER: (Mr. Saul) "The amount of tolerance in the main bearings is a fixed figure and depends on the diameter of the bearings and would vary from approximately .001 to .002 for small diameters up to .005 or .006 on a large inclinable press, and a good deal more than that on the larger presses. That is a standard figure which is available up and down the line, and all press manufacturers stick pretty close to it."

ANSWER: (Mr. Morse) "I believe that the party who asked that question probably had in

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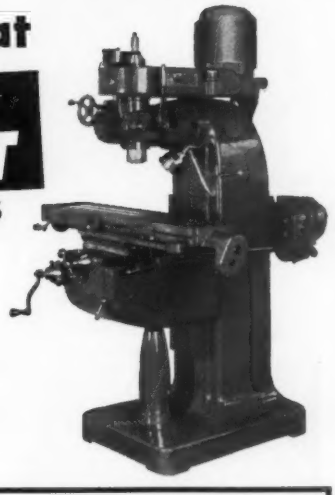
Model 55



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VERTICAL MODEL 40
An outstanding machine that has proved itself in highly satisfactory service for 15 years. While it is not a jig borer, it is widely used for accurate boring and locating. The improved spindle drive gives nine spindle speeds, an ample range for all operations. CAPACITY, ½" to 1" end mills in tool steel. TABLE, working surface 8" x 26", 8" x 34" overall.

HORIZONTAL MODEL 60
A simple, efficient machine that in many ways equals or exceeds a light No. 2 in capacity. Designed for the average tool room, but its rigidity and low maintenance cost make it suitable for production shops. Standard table 40" x 9" with larger table optional. Compact and with all operating parts enclosed yet readily accessible. Controls conveniently located for ease of operation.

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mind—When does he have to take into consideration the slack that he has in the bearings?

"Apparently a good rule of thumb would be, when your slack begins to exceed .001 of an inch per inch in diameter of your bearing, you had better begin to give it your consideration."

QUESTION: "When reducing the speed of a press by variable drive, do you lose tonnage capacity?"

ANSWER: (Mr. Verson) "When you use a variable speed drive on a press, let us assume some definite figures which will be applicable. Let us assume that we have a press that has a three to one variable speed drive, operating at 15 to 45 strokes a minute. Under normal circumstances this press would be figured to give its rated capacity at 30 strokes per minute or the mid-speed. When you decrease the speed at which you are operating, your tonnage decreases as the square. In other words, if you decrease from 30 to 15, you have 15 squared, which is 225, and 30 squared, which is 900, so you have 225/900 of your rated capacity available.

"It also follows that when you increase the speed the tonnage that theoretically could be produced increases as the square, so that you increase in the ratio of 45 squared to 30 squared. So that when a variable speed drive is used on a machine, great care must be exercised when varying from the mid-speed or rated tonnage position. You have to exercise care when going down, that you don't take a rated capacity job and try to run it at the low speed. Similarly, you have to take care, when you go to the high speed that you don't try to put in a job that will take over tonnage, just because the variable speed drive is capable of that."

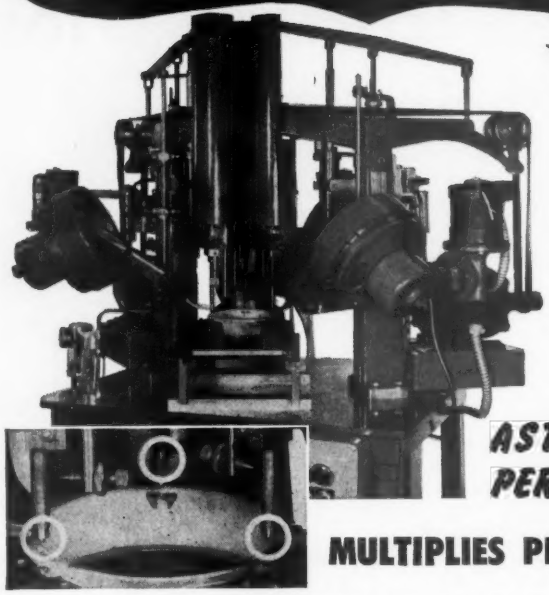
QUESTION: "Using the variable speed drive, as you do, how do you rate tonnage at the low speeds and high speeds?"

ANSWER: (Mr. Sherman) "I think Mr. Verson just answered that. If there is any doubt as to whether the job can be produced at the lower speed, then the load should be reduced to a matter of inch-tons, and to compare with the flywheel. On an automatic press, you should take into consideration that you cannot take as much energy out of the flywheel as you do in a single-operation press. In the automatic press you regain your energy at each stroke, whereas in the single-operation job, you may have two, three or a dozen strokes in order to bring the flywheel back to speed. On the automatic press the flywheel is usually designed to give up about seven per cent energy as a maximum. If you take over ten percent the chances are you won't regain it."

QUESTION: "What is the advantage of the Henry & Wright principle of press design as against the standard upright, straight-sided Keller press?"

ANSWER: (Mr. Sherman) "I think we are the only manufacturer that makes both types. Actual tests that we have made of the dieing machine as compared with our double-crank straight-sided press have shown that the dieing machine alignment is superior. In the overhead crankshaft press, the angle

This Remarkable "GROUP OPERATION"
DRIVES 3 SCREWS at ONE TIME!



AN ASTONISHING PERFORMANCE
MULTIPLIES PRODUCTION!

Three standard DPS SCREWDRIVING MACHINES, mounted on a common base, are feeding and driving three screws simultaneously into an automobile headlight frame as fast as one could be driven. (The three heads can be operated simultaneously or individually as desired.) Just another instance where Detroit Power Screwdrivers do the unusual.

Have you an assembly problem? Tell us about it. Let us show you how you, too, can profit by the marvelous speed and incredibly low-cost operation of these versatile machines. Get details and our recent catalog.

DETROIT POWER SCREWDRIVER CO.
2827 W. FORT ST. DETROIT 16, MICH.

of thrust from the crankshaft which you get in any crankshaft, whether it is in the press or in the gas engine, is put directly on the slide and through the connection. Well, that resolves in two forces, a vertical force to do the work and a horizontal force which tends to push the slide toward the back of the guide. We get that same thing in the dieing machine, but in the dieing machine we don't take it on the punch-carrying member. We take it on the lower crosshead and the upper crosshead guide in the long adjustable bushings in the die bed. The ratio of the distance from the lower crosshead to the guide rod bushing is about six time what it is from the bushing to the die. So if there is any movement down there, it is reduced in the proportion of about one-sixth."

QUESTION: "What effect does press tonnage have on punch breakage?"

ANSWER: (Mr. Verson) "I think that question has two answers. First, the steel used in the punch has a great deal to do with it, based on the cross-sectional area of the punch in relation to the capacity of the machine.

"Secondly, I think die design has a lot more to do with it than possibly even the press itself."

QUESTION: "If you had to punch a ¼ inch hole through 5/16 inch stock with 100 per cent straight wall holes to be tapped, would you use a hydraulic or mechanical type press?"

ANSWER: (Mr. Verson) "I would use a mechanical press, myself."

ANSWER: (Mr. Sommer) "That is all right, but I would almost say you would not get a straight hole. If you are going to pierce, you get a breakthrough. I would think you would have to have a sizing operation afterwards."

ANSWER: (Mr. Dunlap) "I would like to add something. One thing you want to remember, in punching a hole of that nature, is that where you are trying to control the size through the metal section your tonnage again doubles. You don't allow the metal to fracture in its normal course, and you are actually doubling the load by holding close clearances on that thickness of metal. You actually have a double shearing condition there."

QUESTION: "Is it desirable to contact material with high or low speed in blanking?"

ANSWER: (Mr. Sommer) "I was just going to say that tests have shown, I think, that a lot of the die wear is due to breakthrough rather than the initial shock. So it doesn't usually, in conventional speed and conventional type presses, make too much difference what the approach speed is."

PMI Annual Meeting

The Pressed Metal Institute's Annual Meeting for members of the pressed metal fabricating industry will be held in Philadelphia, October 7th through October 10th. The National Program Committee, headed by Mr. C. Glenwood Rose, President of Judson & Rose, Inc., plans to stress the importance of human relations in today's industrial economy. A unique panel discussion of the part statistics play in the everyday operation of a stamping plant will also be featured.

You Asked For It!

NEW 9" Buck AJUST-TRU CHUCKS

It's Ready For You...

6 JAWS

OR 3 JAWS

External and internal, in 4", 5", 6", 7½" — and now 9" — chuck diameters.

Now there's a 9" Buck Ajust-Tru chuck, which many manufacturers asked to be produced.

Its jaws hold work from ¼" to 8" outside diameter.

It adjusts to within .0005" much quicker than any other chuck — *holds* that prerision on duplicate parts with *scroll chuck re-chucking speed.*

There's nothing like it — *anyplace* — for saving you money in the tool room, or on production. Send for catalog with complete details.

BUCK TOOL COMPANY

618 Schippers Lane • Kalamazoo, Michigan

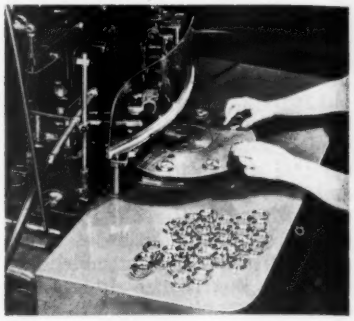
Automatic Press Feeding

Increased production with the additional advantage of better safety are combined in the mechanical punch press feeder developed for secondary operations by V & O Press Co., Division of Emhart Mfg. Co., Hudson, N. Y.

A production increase of more than 400 per cent was realized by one firm when the V & O Feed-O-Matic was installed for secondary die operations, in this case positioning ball bearing races. The press attachment cut the time of the operation from .210 of a minute to .046 of a minute for each piece.

At the same time, the operator is protected from the danger zone, substantially increasing his production rate. The operator simply places the parts in recesses on the Feed-O-Matic dial table. The machine does the rest.

Accurate placing of the part by the Feed-O-Matic contributes to longer die life and better tool design. The Feed-O-Matic controls the press operation.



In complete safety, operator places ball bearing races in nests on rotating table of Feed-O-Matic. This feeder for secondary press operations has increased production as high as 400 per cent.

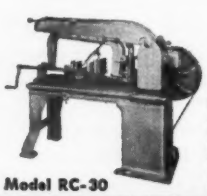
For additional information address V & O Press Co., Div. Emhart Mfg. Co., Hudson, N. Y. or

Circle Inform-A-Gram No. D3.

CUTTING ECONOMY... with SAJO Hydraulic Hacksaws

Another Swedish contribution to lower manufacturing costs! SAJO Power Hacksaws, produced by Sweden's largest Hacksaw manufacturer, are available in three models — all Hydraulic — designed to meet the needs of the small, medium or large metal-working plants. Operation is simple and foolproof. Modern design, sturdy construction and painstaking workmanship put SAJO on a par with the finest in hacksaws. Their modest cost represents an outstanding value in this type of metal cutting equipment.

NO PRIORITY
PROMPT DELIVERIES
ATTRACTIVE PRICES



Model RC-30

Write for literature and prices on:
Light Duty Model RC-30, 6" x 6" capacity
Medium Duty Model RC-45, 9" x 9" capacity
Heavy Duty Model RC-250, 10" x 10" capacity

Each machine carrying the Austin seal is sold with the manufacturer's full guarantee and our positive assurance of user's satisfaction. Replacement parts — in stock.

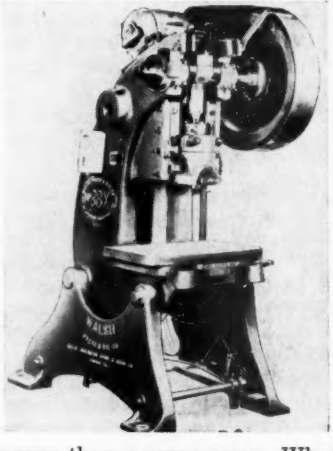
Compare carefully. You'll choose SAJO!

AUSTIN INDUSTRIAL CORP. 76-X MAMARONECK AVE. WHITE PLAINS, N. Y.

DEALERS IN PRINCIPAL CITIES

The Reason for the Walsh 38x Press

In line with their policy of building durable, accurate punch press equipment, Walsh Press & Die Company designed the 38X Punch Press. It also serves as a try-out press with greater accuracy than a screw press. When a screw press is used to try out dies, almost any material will work successfully as the press speed may be only one or two strokes per minute. The same material used on expensive dies

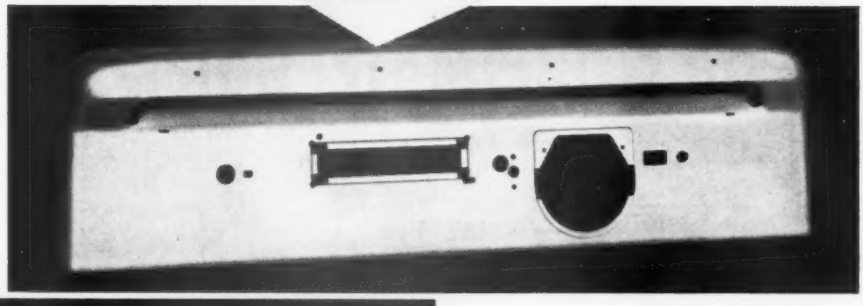


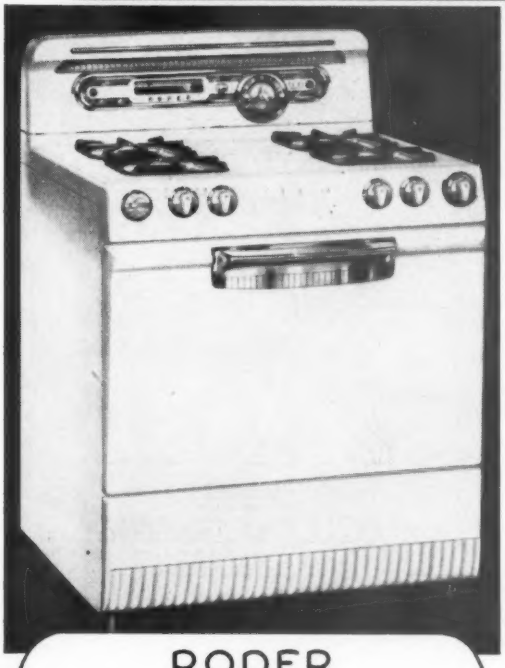
. . . *Continued on page 133*

SIXTEEN BARTH DIES

DRAW
BLANK
PIERCE
FORM
TRIM
WIPE-OVER

BACKRAIL OF "ROPER" RANGE





"SPACE MASTER RANGE"

DIE FUNCTION DATA

#1 Draws Light-Housing	#9 Trims and Pierces Top Flange
#2 Rough Blanks	#10 Wipes-over two bottom back corners
#3 Pierces Light-Slot	#11 Wipes-over Bottom Flange
#4 Forms box	#12 Wipes-over Top Corners
#5 Pierces Bottom Edge	#13 Wipes-over Ends
#6 Trims Bottom Back Corners	#14 Wipes-over Top Flange
#7 Trims Top Corners	#15 Pierces Instrument Control Panel
#8 Trims and Pierces Two Ends	#16 Pierces 2-Inch Hole for Clock

MANY STOVE INDUSTRY JOBS come regularly to the Barth organization because Barth has proven by actual performance that they have the stove-production "know-how" to assure quality performance at low cost.

Expressions such as the following received from the Geo. D. Roper Corporation of Rockford, Illinois after their Barth dies were put into production operation, are typical of Barth's standing in the stove industry:—

"The public response to early showing of the new Roper 'Space Master Range' has been tremendous . . . as supplier of the back-rail dies in this project, we believe that you can rightfully share our pride in the product."

Geo. D. Roper Corporation

Why not call in Barth on your next tool, die, fixture or special machinery requirement? Many industries utilize our experience and facilities to maintain their production on an economical basis. Write for the Barth Catalogue.

BARTH STAMPING & MACHINE WORKS Inc.

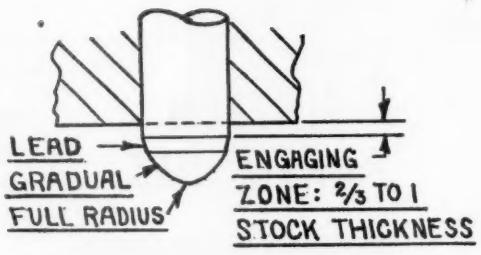
12650 Brookpark Road, Cleveland 29, Ohio

DESIGNERS AND BUILDERS OF DIES, TOOLS AND SPECIAL MACHINERY

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

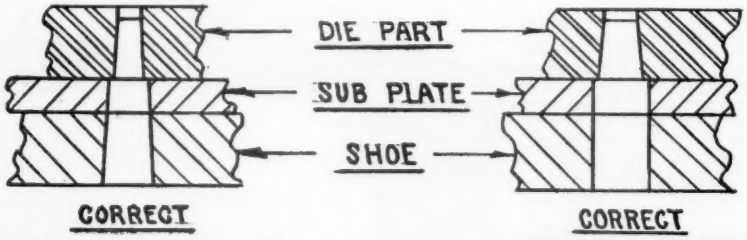
. . . **Punches, from page 66**

5. Size of pilots must be in relation to pilot punches; work to drawing specification.
6. Clearance between pilot and pilot hole in die must be held to a minimum. Allow slide fit or .0005″ maximum clearance.
7. Maximum engaging zone for pilots to be not more than one metal thickness unless otherwise specified. Nose of pilot to be gradual and not blunt.
8. Water and oil hardened punches, pilots and plungers to be tempered blue on head area.
9. Punches to have provision for air hole or spring plunger when large enough.
10. Spring plungers to work free but not to have a sloppy fit. Grind only when specified. Allow generous fillet on head.
11. Punch holder to be jig bored.

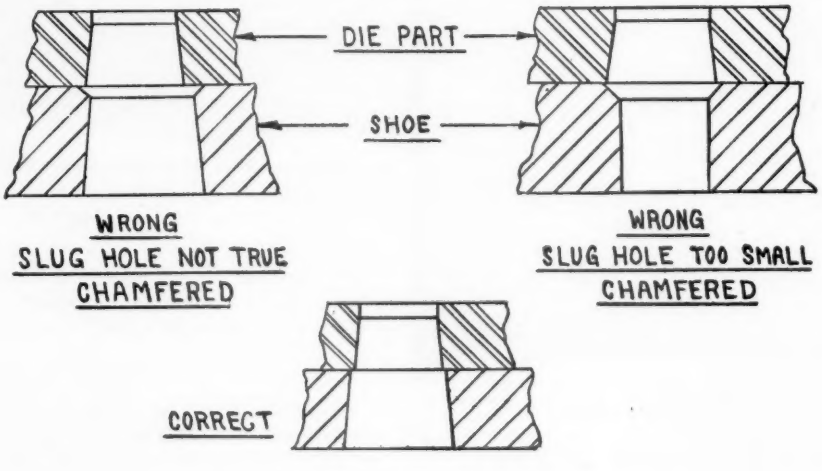


SLUG HOLES

1. All round slug holes in sub-plate and shoe must be taper reamed for thin stock. For .050″ stock and heavier and above 3/8″ diameter, they may be left straight.

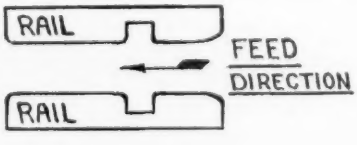


2. Irregular shaped slug holes must be free from rough saw marks.
3. All slug holes to be larger and fairly true with die bottom contour. Do not chamfer top of slug holes. Remove burrs by scraping.



STRIPPERS — KNOCKOUTS

1. Channel or solid strippers to have large and well rounded inlets and outlets.
2. Channel or rails to be in line with die assembly.

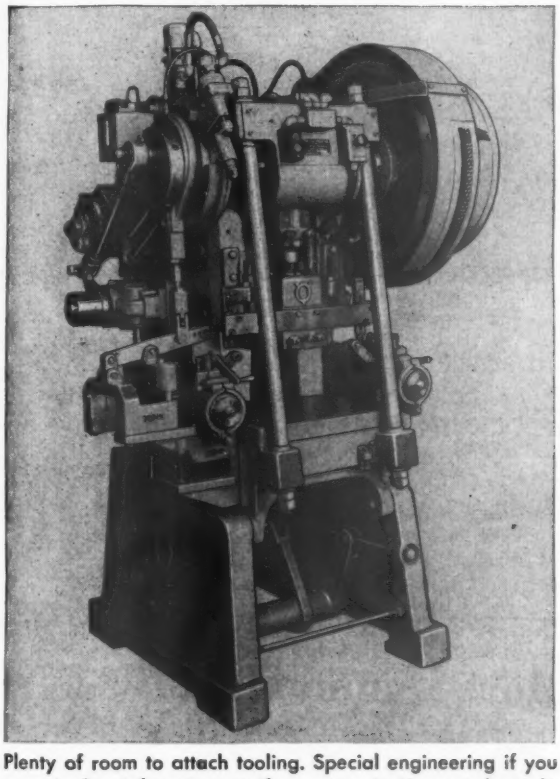


3. Stripper openings for punches, pilots, holders, etc. to be held to a minimum.
4. Sharp corners in channel or rails to be well rounded off towards feeding direction.
5. Finger stops to be slide fit and must not be sloppy in stripper.
6. Dowels to be drive fit in stripper and push fit in die, unless otherwise specified.
7. Guided strippers must be dead square to die assembly. Stripper guide-posts and bushings to be ground and lapped to close working fit. Spring pressure to be equalized as far as possible.

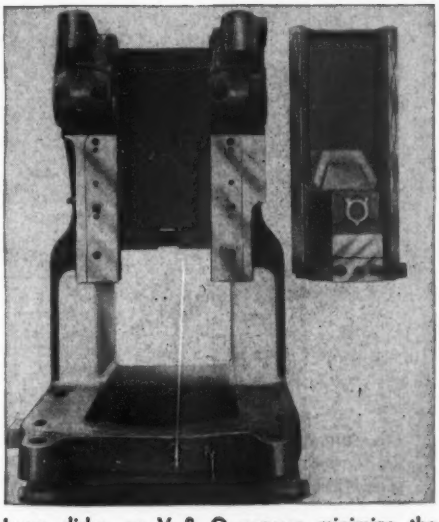
. . . *Continued on page 130*

Precision *all through* the power stroke is what makes precision stampings. Of course, the tools must be made accurately and set up right. But no tools can work more precisely than the machine that operates them.

FOR PRECISION STAMPING GO V&O



Plenty of room to attach tooling. Special engineering if you want it. Special equipment if you want it. You get the right degree of quality control at the right cost when you go V & O.



Long slides on V & O presses minimize the possibility of angular misalignment during the power stroke. Accuracy in every working member, stiffness in every load bearing part: these are only a few of the features that assure precision all through the power stroke on V & O presses.

We would like to show you all the reasons why V & O presses deliver precision all through the power stroke. A representative is near you.

Only the best is good enough

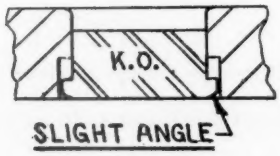
DESCRIPTIVE CATALOGS containing complete specifications and operating details on V & O Precision Power Presses and Feeds are available. Please write the V & O Press Company, 421 Union Turnpike, Hudson, N. Y.

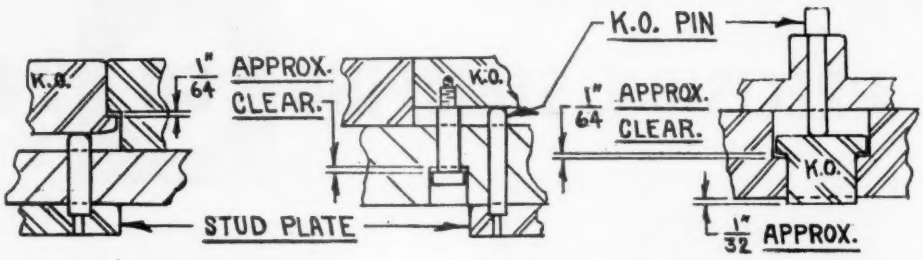
THE V & O PRESS COMPANY
Division of Emhart Mfg. Co.
BUILDERS OF PRECISION POWER PRESSES AND FEEDS SINCE 1889
HUDSON NEW YORK

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

. . . Strippers, from page 128

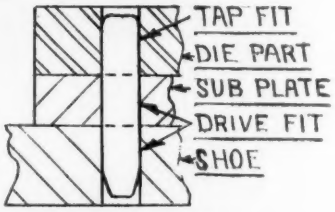
8. Positive knockouts to have provision for knock-off pin.
9. Shoulders of knockout to have generous fillets. Knockouts which "hit home" should have a slight angle on bottom to prevent smashing of shoulders.
10. Water and oil hardened knockouts to be tempered blue on shoulders.
11. On spring strippers and knockouts use "Maximum" for length of springs.
12. Length of knockout pins must prevent smashing of knockout shoulders or stripper bolts.



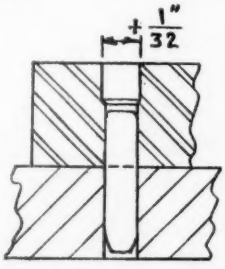


DOWELS — SCREWS

1. Hardened precision dowel pins only to be used.
2. Dowels must be drive fit in shoe or sub-plate and light tap fit in die part.
3. Dowel holes in all hardened parts to be jig ground, and lapped to proper fit in lapping machine. Avoid lapping in drill press or in lathe.



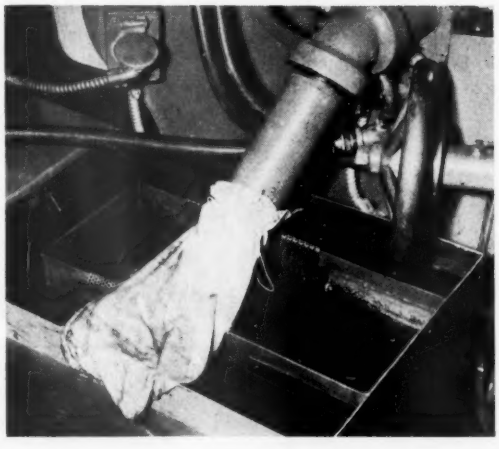
4. Permit no scale in dowel holes.
5. Dowel holes in sections above 2" thickness may be opened up 1/32" for about half the section thickness.
6. Interchangeable doweled units to have hardened and ground liner bushings.
7. All holding screws to have the following minimum length of grip: Up to ½" size — twice the diameter; above ½" size — 1½ times the diameter.
8. Full threads to be tapped for all holding purposes, especially for set screws and adjusting screws.
9. All tapped holes to be clean of loose chips.
10. All screw and dowel holes must be square to holding surface. Care must be taken when drilling — reaming — tapping.



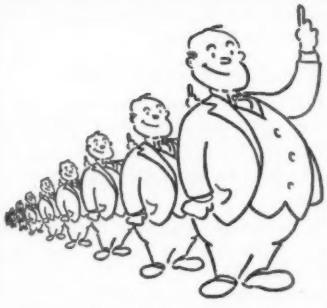
Cloth Sack Saves More Diamonds

A sack may be the answer to greater diamond salvage in industry. At the Edmore, Michigan plant of the Carboloy Department of General Electric Company, an ordinary cloth sugar bag is tied to the outlet end of the coolant pipe leading from those grinding machines that use diamond wheels.

When other types of grinding wheels are used on the same machines, the bag is removed to allow coolant and non-diamond sludge to go into the regular coolant recovery system. The heavier diamond concentration in the sludge bag permits more complete recovery and is less costly than reclamation processing of a much larger volume of mixed sludge having a poor diamond concentration.



TRACER CONTROLLED MACHINING APPLIED TO CINN. TRAY-TOP LATHE



REDUCED MACHINING TIME OVER 80%

MR. DUPLICATOR SAYS "Why does a duplicator for a lathe have to be designed in a fixed position?"

WALKER SAYS "A true duplicator should mean just what it says and not be limited in its turning scope. This is brought out fully in our universal step-turning design for a duplicator applied to a lathe.

A typical application is shown on a Cincinnati Tray-Top lathe above. At present it is set to duplicate, moving parallel with the cross slide. Walker replaced the standard compound with a duplicating unit that has a tracer control valve mounted in front, on a bracket that can be swiveled to compensate for any selected position of the compound. Template holder arrangements are made so that facing or boring can be taken care of very easily. With template and tracer in front, this short-couple design enables the machine to duplicate much more accurately and allows the operator a greater feeling of security. No need for operator to do any adjusting behind the lathe . . . everything is in front.

This tray-top lathe with a WALKER HYDRAULIC DUPLICATOR reproduces the intricate surface form on this shaft in 1½ hrs. as against 8½ hrs. with former methods. Note long length of template. Template holder is supported at both ends . . with a rest in the center . . moving with the carriage.

WALKER DUPLICATORS are turning rolls, boring odd shapes, milling uneven surfaces, and are even applied to grinders and planers. There are very few jobs that can't be done to greater advantage with the aid of our duplicators . . . we can help you with your machining problems.

We can furnish a thorough and understandable solution to your Duplicating problems. Send us a print of the part to be made, along with the make and size of machine to be modernized, and we will give you recommendations and firm quotation.

REPRESENTATIVES IN PRINCIPAL AREAS

Walker HYDRAULIC DUPLICATOR CO.

P. O. Box 455 STANDISH, MICHIGAN

Pioneer Designers and Builders of Precision Duplicating Equipment

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

STRETCH and COMPRESSION
CONTOUR FORMED PARTS
to your
SPECIFICATIONS

...with Speed
and Accuracy...
no buckling of horizontal flanges

Economy is one of the many advantages that make Contour Forming an important factor in the construction of aircraft, jet engines, guided missiles, railroad coaches, trucks, buses, etc. Single or compound curves, true, full circles or segments, shallow bends or short radius curves can be formed in most metals, including 95% titanium. Many manufacturers have profited by using our highly experienced Forming Division as an extension of their own production facilities. Send us a print and quantity requirements of some of your needed parts and we will quote on them.

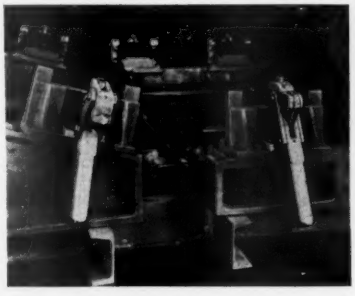
Our new 32-page catalog CF-352 is just off the press and your copy is waiting for you. Send for it.

THE CYRIL BATH COMPANY
MANUFACTURERS of METAL FORMING MACHINERY
6933 MACHINERY AVE. • CLEVELAND 3, OHIO

Toggle Clamps and Pressure Units

Replaceable Bushings

The most wear on toggle clamps takes place at the pivot points. To minimize this problem the E & E Engineering Company now features the Merriman Replaceable hardened steel bushings for installation at all pivot points of their La-Ko and



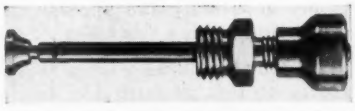
Thayer clamps. To renew the La-Ko and Thayer clamps, merely push out the old bushing and push in a new one.

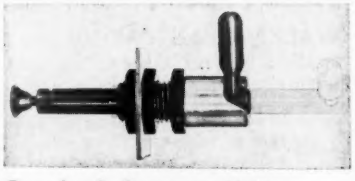
Fast Acting Pressure Unit

The Merriman pressure unit, below top, is designed for the rapid application of pressure to work pieces in clamping operations.

To operate simply push the foot up to the work and tighten the knurled nut.

In applying pressure, a quarter turn of the knurled nut is all that is necessary.





Gun Lock Pressure Unit

This pressure unit, just above, has a cam lock and fulfills many clamping requirements. Cam pressure is exerted on the last ¼" of travel.

For complete information write E & E Engineering Co., 14404 Mack Ave., Detroit 15, Mich. or
Circle Inform-A-Gram No. D6.

FOR PRODUCT INFORMATION USE CONVENIENT INFORM-A-GRAM CARD

. . . Walsh Press, from page 126

in a punch press at approximately 100 strokes per minute quite often will not flow properly and will tear.

The Walsh 38X press was designed as a try-out press and also as a production unit for large or small production runs. A large number of these presses, flywheel or back gear models, are now in use and have not only given excellent service as die try-out presses and for shearing-in dies and punches, but also have eliminated the necessity of having screw type presses in the tool room. This cuts equipment costs and saves valuable space. The durability and long time accuracy of Walsh punch presses is proved by the fact that replacement parts are still furnished for presses forty years old. Twenty-four hour repair service keeps Walsh presses on a full time profitable productive basis.

For complete specifications write Walsh Press & Die Co., 4709 W. Kinzie St., Chicago 44, Ill., or

Circle Inform-A-Gram No. D4.

Decorating Instrument Panels

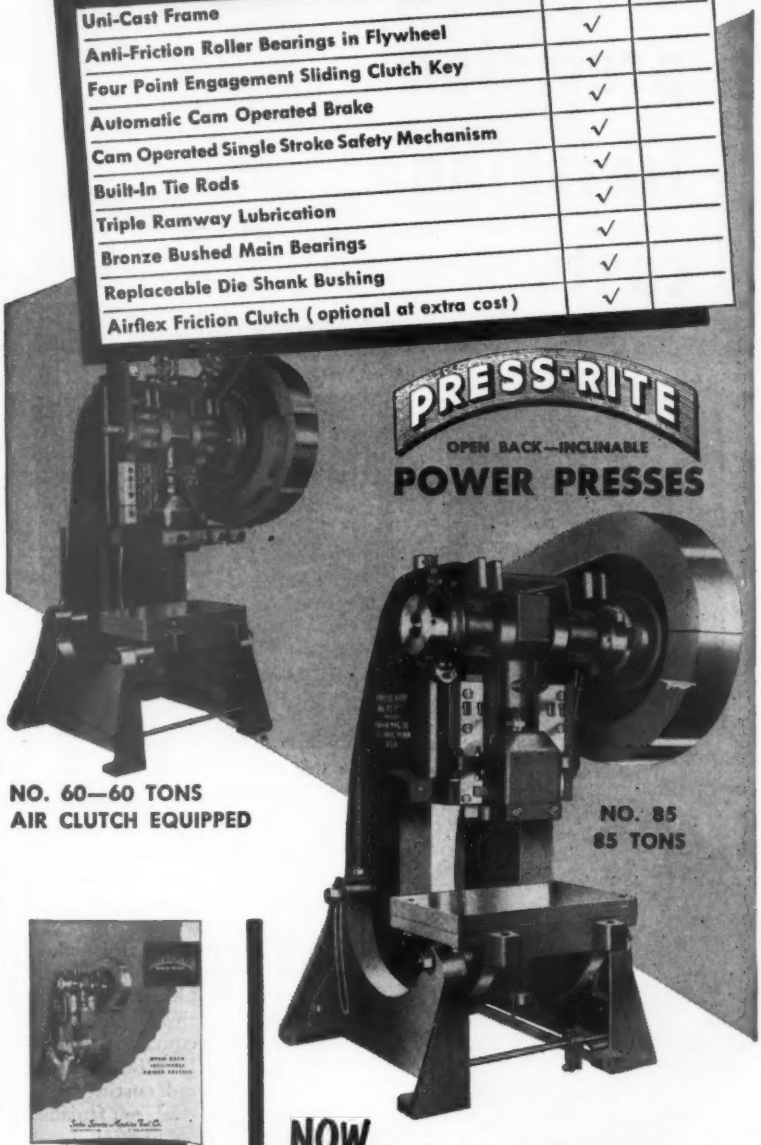
The spray-decorating of 175 instrument panels per hour, with one man loading, another unloading, and a third painting, is being accomplished on 1953 models in each assembly plant throughout the U. S. and Canada of a prominent automotive manufacturer. This painting is done at a transfer station on the conveyor line, thus combining the transfer handling and the painting operations.

Electro-formed metal masks, air-operated fixtures, and mask-washing machines are employed to accomplish this high production rate.

It is reported by the car manufacturer that 100 sprays are achieved before mask-cleaning is required. The fixtures operate at a pressure of 25 psi on the 28″ stroke, 4″ diameter air piston, which produces a positive-pressure seal between the work and the mask, thus assuring a cleanly painted line.

How does YOUR PRESS check out?

STANDARD PRESS FEATURES (at no extra cost)	PRESS-RITE	YOUR PRESS
Uni-Cast Frame	√	
Anti-Friction Roller Bearings in Flywheel	√	
Four Point Engagement Sliding Clutch Key	√	
Automatic Cam Operated Brake	√	
Cam Operated Single Stroke Safety Mechanism	√	
Built-In Tie Rods	√	
Triple Ramway Lubrication	√	
Bronze Bushed Main Bearings	√	
Replaceable Die Shank Bushing	√	
Airflex Friction Clutch (optional at extra cost)	√	



Get all the facts

About Press-Rite Press features, together with specifications. A complete line of 8 models from 5 to 85 tons capacity.

NOW You Get All These Features in *One* Press . . . the Press-Rite Press. Buy Press-Rite Presses today and get increased production . . . longer die life . . . greater operator confidence . . . longer press life . . . and scores of other benefits. Press-Rite Presses help to cut your operating expense and eliminate costly down time. Find out more about Press-Rite Presses today.

Send for Bulletin P552.

Sales Service Machine Tool Co.

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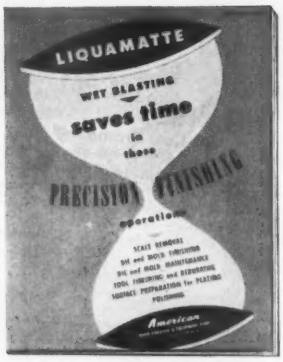
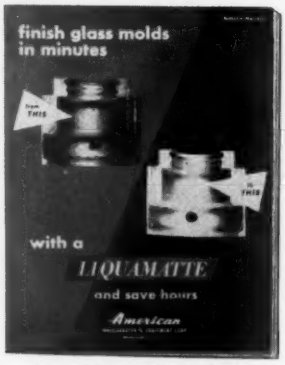
2363 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA

how to cut precision finishing costs



Save Time on Tools, Dies, Molds.
Bulletin 43



Save Time on Glass Molds
Bulletin 53

Save Time on Plastic Molds.
Bulletin 63

The bulletins illustrated above show how tools, dies, molds, engine parts, etc. requiring 1 to 6 hours to finish by hand methods are now finished in from 30 seconds to 10 minutes in a Liquamatte Wet Blasting machine. They explain how manual operations are practically eliminated as dies, molds and cutting tools are cleaned and/or finished to tolerances of .0001".

Take the first step towards reducing your finishing costs and *send for one or more of these bulletins today.*

American LIQUAMATTE
WHEELABRATOR & EQUIPMENT CORP. WET BLASTING

852 S. Byrkit St. • Mishawaka, Ind.

High Production, Free-Machining Screw Steel

A new, free-machining, cold-finished bar steel having important advantages over conventional screw stock, is now being produced for general use by industry. Laboratory tests and production trials have demonstrated that the new steel offers greater uniformity, superior machinability, a higher quality finish, and longer tool life than previous free-machining steels.

The new J&L "1200" series is of analysis comparable to the conventional AISI "1200" series and the SAE "1100" series steels. Three separate analyses comprise the series—1211, 1212, and 1213.

Steels in this group represent a delicate balance in chemistry, and uniformity in internal structure is highly desirable but has always been difficult to attain. To achieve this uniformity and good machinability, and still retain the requisite physical properties for ultimate applications, metallurgists turned to the closer control of chemistry and temperature and the larger heat size possible in the modern open hearth furnace. This process gives considerably greater uniformity within the heat and from one heat to another.

Bars are then cold drawn to impart additional desirable physical properties. Doing so increases the strength of the steel, lowers its ductility, provides a good ready-to-use finish, and close dimensional control. Mechanical properties are quite similar to conventional bessemer steels of like analysis.

Nearly two-thirds of the plants cooperating in the initial production tests reported that the new steels were not only entirely satisfactory, but actually better—in terms of production speed, finish, or tool life — than the free-machining stock they had been using.

Like conventional bessemer screw stock, J&L "1200" steels are not recommended for cyaniding or carburizing. In practice, however, the new steels — like bessemer steels — will probably be used to some extent on applications where occasional soft spots will not be harmful.

Typical Job Studies

Operation: Production of **wheel hub** on a six-spindle 2" Acme Automatic, with center spot, rough form, drill and second rough form, drill and finish form, face and knurl, recess, ream, and cut-off. Speed: Approximately 240 sfpm. Results: Use of 1⅛" J&L 1213 permitted increased speed, longer drill life, improved finish.

. . . *Continued on page 181*

FOR PRODUCT INFORMATION USE CONVENIENT INFORM-A-GRAM CARD

YOU GET SPEED PLUS ACCURACY WITH MOORE JIG GRINDERS

HOLES from 1/64" to 8" Relocated and Ground within .0001" in One-Third Previous Time

Before hardening, this two-station die block was Moore-Jig-Bored to eliminate the need for excessive grinding. After hardening and surface grinding, all holes were Moore-Jig-Ground to exact size and location. Blank hole and center piercing hole were ground with ½° included taper. Little clearance could be allowed between punch and die. Jig grinding time: *only 2¾ hours.*

CONTOURS, Too, Accurately Jig Ground and Checked in One Setting

This flanged punch, impractical to grind by any other method, was a natural for the No. 2 Moore Jig Grinder. All radii—male and female—were ground accurately to location and size. The piece, having been set up on a rotary table, was aligned to permit grinding of the angular surfaces. And the entire contour was inspected by the "indicator measuring" method while the punch was still on the machine.

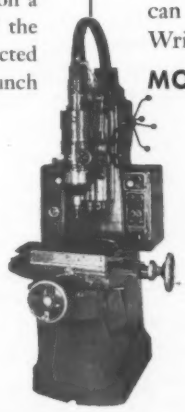
The word "versatile" must have been coined for the No. 2 Moore Jig Grinder. Not only does this machine relocate and grind straight and tapered holes with ease, but it contour grinds, chop grinds and slot grinds just as skillfully.

The Moore Jig Grinder, together with its toolroom teammate, the Moore Jig Borer, enables tool and die sections to be produced concurrently, puts diemaking on an interchangeable-parts-and-assembly basis. And it's also a time-saver on production jobs.

Employing the accurate lead screw measuring principle and a convenient system of coordinate hole location, the fast and sure Moore Jig Grinder eliminates hours of checking on bench and surface plate.

Why not find out how this remarkable machine can save *you* sizeable chunks of time and money. Write today for our detailed bulletin.

MOORE SPECIAL TOOL COMPANY, INC.
726 Union Ave., Bridgeport 7, Conn.



NO. 2 MOORE JIG GRINDER
Range 10" x 16" x 16" height. Grinding speeds from 12,000 to 60,000 rpm. Infinite feeds up and down; spindle-housing heat control. Features slot grinding attachment.

ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

see our catalog in MACHINE TOOL CATALOGS or write for copy

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

CARBIDES IN THE PRESS ROOM

Introduction

The advantages of sintered carbides, frequently referred to as cemented carbides, in both the machine tool and press working fields have long been realized; their use gradually expanding through the combined efforts of (a) application within the field; (b) research on new materials, procedures and design; and, (c) production technique. Thus, at the present time, there are innumerable applications where this type material is used advantageously.

by Lester F. Spencer
Chief Metallurgist
LANDERS FRARY & CLARK
New Britain, Conn.

The practical application of sintered carbides for the purpose of forming or shaping materials is attributed to its remarkable high hardness and great compressive strength; both of these characteristics being essential to a material intended to resist wear. Not only have carbides these properties at room temperature, but also, upon the application of heat, carbides retain an indentation hardness which is higher than other conventional type alloys hardened by heat and quench to produce identical tools.

The use of carbides as a die material can be traced to World War I when it was developed in Germany. In the late twenties, it was employed in the United States; the first application was the hot drawing of both tungsten and molybdenum wire. Its use was expanded into other fields such as the cold drawing of steel wire and tubes, in the cold extrusion process, in cold heading, etc.

Although development of sintered carbides as a commercial tool material was a slow process, so characteristic in the adoption of new methods or materials, it is now widely used for applications within the press room such as drawing, forming, piercing and blanking operations. In many press tool applications, it has proved out that the sintered carbide as a die material lasts many times longer and causes but a small fraction of the trouble as compared to the use of conventional steel dies.

In the use of a selected carbide composition, the resultant die life is predicated on a number of factors which include, (a) the design of the section to be formed; (b) the type of material that is to be processed; (c) the type and condition of the equipment; (d) the physical characteristics of the material to be formed, such as hardness, thickness, surface condition, etc.; and, (e) such factors as the ingenuity in mounting the die nibs or sections, the care given the die components during operation and storage, and the type of lubricant.

With a proper choice of carbide material, a properly designed die can be expected to produce a minimum of ten times the number of parts previously produced between grinds on the conventional steel die. Experience indicates also that properly designed carbide dies can be re-dressed by a removal of from 0.002 to 0.003 inches of stock per grind. This can be compared to an average of 0.020 inches of stock removal upon re-dressing a conventional steel die. This usually results in that the average life of the carbide die is from twenty to forty times that of a comparable steel die.

Apart from production figures, many concerns have discovered that a better finish can be obtained along with closer dimensional control by the use of carbides as die components. Due to the fact that the coefficient of friction of sintered carbides is less than that of conventional tool steel compositions, the carbide dies can, in many instances, be fitted to closer tolerances and clearances without consideration of thermal expansion. This is particularly true when the matrix is of Invar metal since the coefficient of expansion of these two materials is closely related.

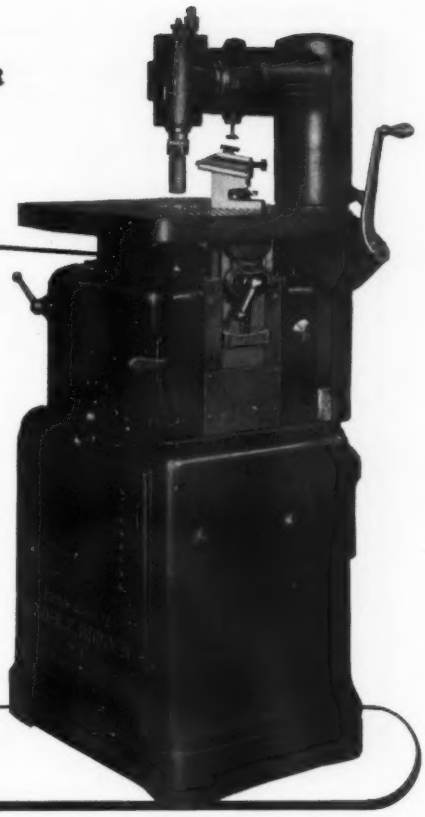
The use of carbides as die components has greatly increased the maximum speed at which a press may operate. In some instances, however, this cannot be taken full advantage of, due to the inadequacy of the equipment. Thus, the press equipment which will be employed should be rigid, have good alignment, a good feeding mechanism and sufficient speed and power. It should also be remembered that maximum production can

. . . *Continued on page 142*

FOR GRINDING ODD AND IRREGULAR SHAPES AND DIFFICULT CONTOURS

Boyar-Schultz No. 2

Profile Grinder



A Standard tool in tool and die shops where grinding odd shapes and irregular contours is necessary. It is a time-saver in grinding and fitting large dies and punches such as forming dies for refrigerators, table tops, large dies for sanitary ware and in automotive and locomotive shops.

Both spindles in the Dual Spindle Model illustrated turn at 10,000 R. P. M. giving rapid stock removal, even with small diameter wheels. Spindles accommodate wheels ¼" to 3".

Form tool as illustrated, used for turning flanged car wheels, requires about 8 hours of a skilled mechanic's time when using the old method of hand filing and hand stoning. With Boyar-Schultz No. 2 Profile Grinder the form tool is finished in 2 hours . . . a saving of 6 hours.

BOYAR-SCHULTZ CORPORATION
2112 WALNUT STREET • CHICAGO 12

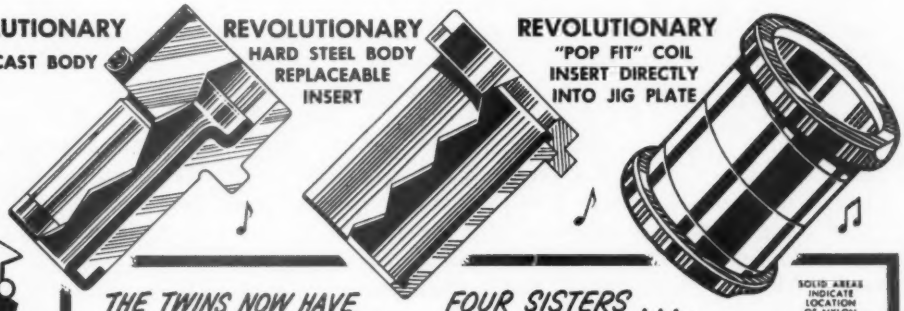
WE SING FIBS IN Hi-C *Because the Truth is more Fantastic!*

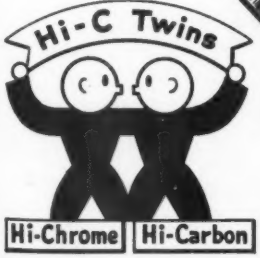
We reported savings of $100.00 per week on a job, and the truth is that it was over $200.00 per week. This has been reported, not once, but many times. **WHAMMITY! BANG! HERE GOES ANOTHER WHOPPER! Revere Bushings are more economical than any other, including tungsten carbide!**

REVOLUTIONARY DIE CAST BODY

REVOLUTIONARY HARD STEEL BODY REPLACEABLE INSERT

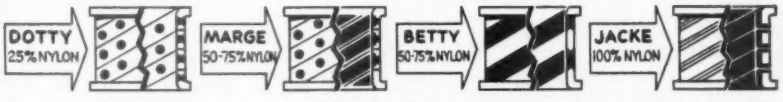
REVOLUTIONARY "POP FIT" COIL INSERT DIRECTLY INTO JIG PLATE





THE TWINS NOW HAVE FOUR SISTERS . . .

SOLID AREAS INDICATE LOCATION OF NYLON



REVERE BEARINGS FOR MACHINERY AND AUTOMOTIVE USE

Revere Fisher ENGINEERING COMPANY NORTH BRANCH MICHIGAN

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. . . Multi-Slides, from page 50

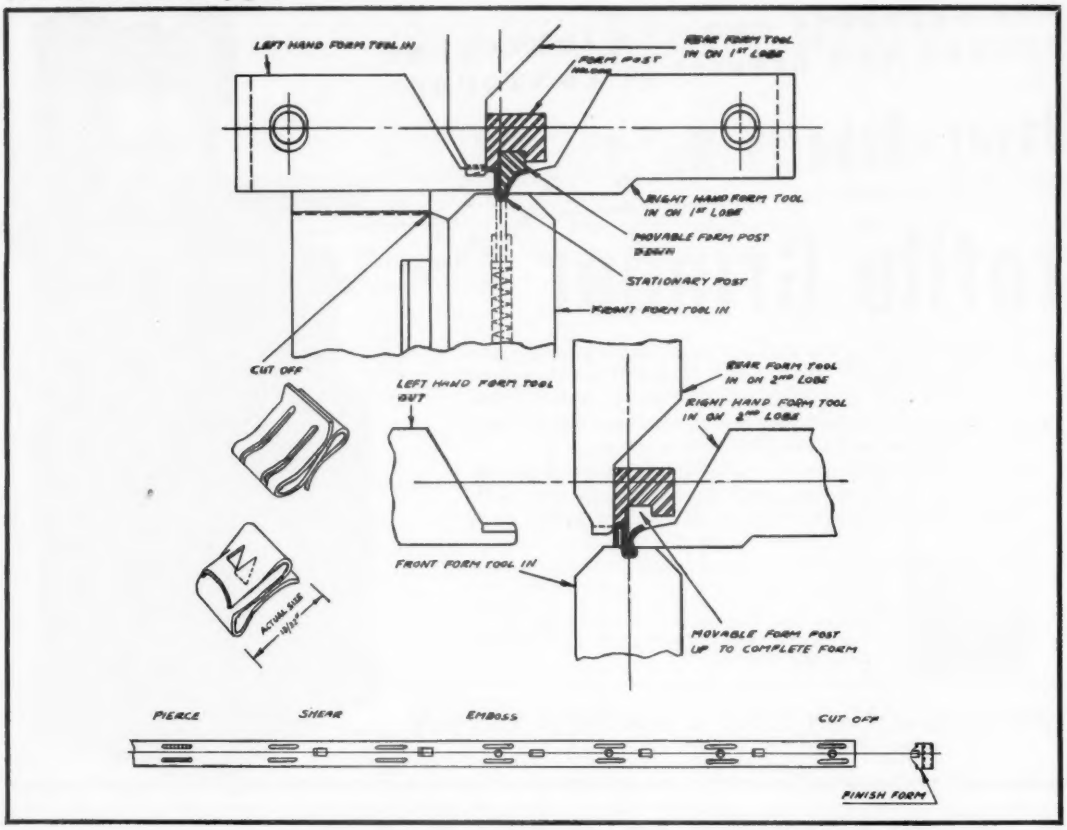

Fig. 7. Operations sequence for electrical part.

Examples

The sequence of operations on a typewriter ribbon spool core is shown by the schematic drawing (Fig. 6). Piercing, notching, trimming, shearing (lancing), and embossing operations are performed in the ram of the machine. The blank is then separated from the strip by means of a tool on the cut-off slide and is immediately picked up by the forming tools. Tools mounted on the front, right hand and left hand slides are used to pre-form the part around a pre-form post. These slides are then withdrawn, and the outer pre-form post is raised out of the way by a lifting rod operated from the stripper mechanism of the machine. The front tool advances again and, with the rear tool, finish forms the part around the finish form post.

Die and forming operations for producing an electrical part from .018 x 5/16" copper are shown in Figure 7. Piercing, shearing, and embossing operations are performed in the ram. The blank is separated from the strip by means of a cut-off slide and is then immediately picked up by the forming tools. Observe that the pre-form is accomplished by using all four forming slides. — The finish form is obtained by using the front, rear, and right hand slides with the movable form post in the "up" position. Note that both the rear and right hand form tools are actuated by two-lobe cams.

In another example, a terminal clip used in outdoor watt-hour meter sockets was produced by means of a three-level forming position (see "Multi-Slide Tooling for Terminal Clips," T & DJ, Sept. '48). The die operations are relatively simple. After cut-off, the blank is immediately picked up in the upper level of the forming position.

In the upper level, one leg of the clip is formed and the other is partially formed. Simultaneously with the return of the feed and the opening of the tools for the next stroke, the stripper mechanism transfers the partially formed blank from the upper level to the center forming level where the second leg of the clip is completely formed. It will be noted that in this position both legs of the

. . . Continued on page 147

the NEW
*BIG JOE
HYDRAULIC LIFTS
Master many more tasks to Trim Your Handling Costs

Stronger fabricated construction but easier to move. Quickly adjustable forks in lengths to suit. Straddle-type base. Floor level loading. Hand-operated brakes. Forks or platform. Pedal or battery operated—latter with lever, push-button and optional remote control, to operate lift as portable elevator. Other new features.

PEDAL CONTROL
Capacity 750 lbs. Lifting heights to 68".
Priced from.... $281.50
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BATTERY OPERATED
Capacity 1000 lbs. Lifting heights to 80". Push Button Control (Remote Control Optional).
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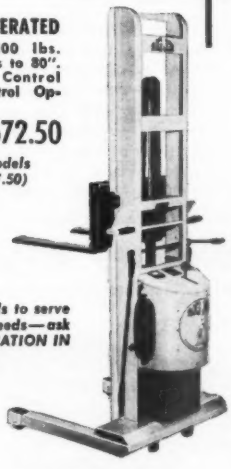

Over 30 models to serve your special needs—ask for DEMONSTRATION IN YOUR PLANT.

Distributors in Principal Cities
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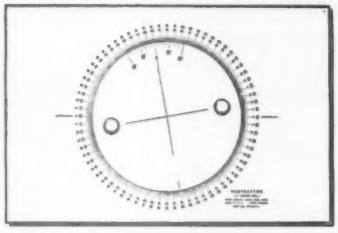
Let BIG JOE do it!

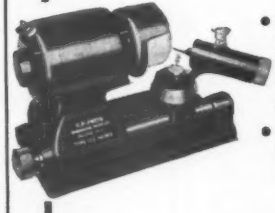
New Chart Means Accurate Readings

Accurate angular measurements are now available on projectors and optical comparators not equipped with screen rotation. No elaborate staging or



complex fixtures are required with new protractor chart with vernier disc now being produced by Gage Printing Co., LTD., Battle Creek, Mich. It provides accurate measurement of angles to 5′ of arc, according to manufacturer. Angles can be located from apex and the chart may be installed on a projector as a replacement or overscreen screen. The chart is available for every make and model. Write for complete data in Bulletin No. 53-850. **Circle Inform-A-Gram No. D1.**

PREIS-PANTO CUTTER GRINDER

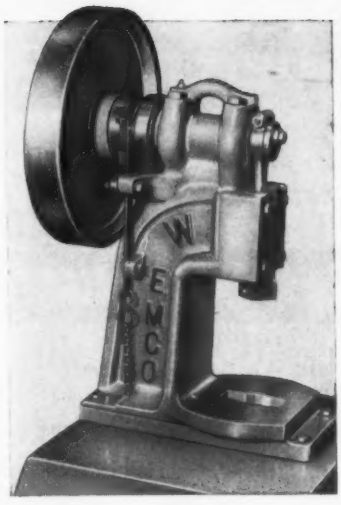


- Precision grinds single lip engraving and routing cutters.
- Highest precision—lowest price.

A sturdy and accurate grinder that produces absolute concentricity, perfect angles and proper clearance on cutters. Also supplied for 2, 3, 4 lip cutters, straight or tapered shanks.

PANTO
Ask for literature upon our full line of Engraving Machines and Accessories.

H. P. PREIS ENGRAVING MACHINE CO.
647 U.S. Route 22 Hillside, N. J.



Emco "W", bench type. Also Emco "X" (larger size). Both sizes also stand-mounted. With or without motor drive.

Emco

POWER PUNCH PRESSES are SPEEDY and SAFE

Versatile Emco "W" and "X" presses excel for punching, forming, stencilling and riveting metal, rubber, leather, plastics and other non-metallic materials. You get up to 300 operations per minute. Profit from big machine speed, strength, rigidity, accuracy and endurance. Compact, fool-proof (non-repeating), simple design—easy to understand and operate. Thousands of Emcos in money-making use testify to Klaas' dependability since 1921.

Two Practical Sizes
Emco "W"—¾" and 1¼" standard stroke
Emco "X"—1½" and 2" standard stroke
Specials to order

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4312 East 49th Street
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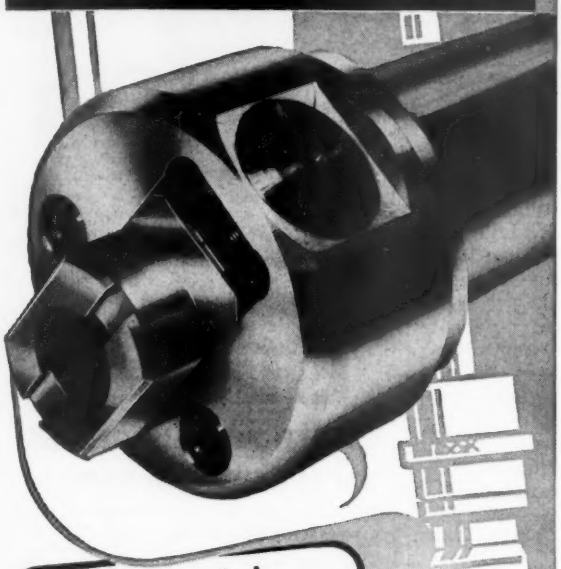

precision built by precision toolmakers for accuracy and durability in service!

• Designed for quick tool change; equipped with new, extra large dial for precision radial adjustment; machined to provide positive dead centering for rigid, high production milling and boring without removal of chuck; available with a complete selection of interchangeable accessories—these are features that make the Samson Offset Boring Chuck the logical first-choice of the field.

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ALSO Distributors of famous LAST WORD WHEEL DRESSERS

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use KIPP AIR GRINDERS

if you want to GRIND —not just rub!

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.

Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. Every mechanic knows this, but inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MADISON-KIPP CORP.
212 Waubesa St., Madison, Wis., U.S.A.

• Skilled in DIE CASTING Mechanics
• Experienced in LUBRICATION Engineering
• Originators of Really High Speed AIR TOOLS

. . . Assembly Line Methods, from page 74

Fig. 5. A production rate of 1800 pieces per press per hour is easily achieved by Baldwin employees in assembly line production of electronic components.

In our production of military electronic components we utilize our punch presses in cutting, forming, and coining operations. Spot welding 3 to 4 welds per second is possible on our three Federal 220 volt, 5 kw electric welders. After welding, the parts are finished on two buffers.

One Kenco press is used to cut the initial strips for our clamps. It has sheared three million pieces from coil stock of ¼ hard ⅜-in. stainless steel, without resharpening the die.

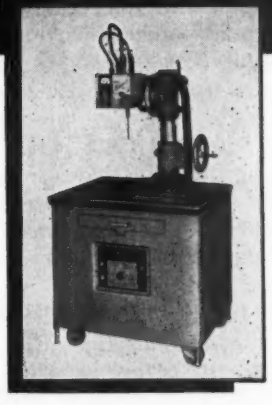
We have also found these small presses give us high capacity, high speed operations and are adaptable for roll feed and coining operations. The wide bed for a small press makes possible the use of a large die which normally calls for a larger punch press.

Another advantage to our production is the lack of hazardous slots in the crankshaft of these presses. The clutch collar contains the driving mechanism which eliminates the slot commonly made in the shaft. Such slots weaken the shaft, and cause the drive dog to break. We have yet to have a broken drive dog.

Punch presses of this type have saved us costly production, proof of which is found in that 50% of all punching operations in industry are done on punch presses under 10 tons. The 4-in-1 features of the Kenco has given us the facilities of a larger press whereby we may utilize it for standard die space, long die space, as a half press or horn press.

METAL DISINTEGRATION

and what it can do for you



Literally hundreds of thousands of dollars are saved annually by corporations that are using Metalmasters in just tool and die repair alone.

There's a technical engineer in your area to give you an on-the-spot demonstration in your own plant at your convenience. (NOTE: It is not uncommon to pay for a Metalmaster with just one short demonstration through savings on workpieces.)

There's a Metalmaster designed for your operation and priced to fit your needs. For information as to the many uses and benefits Metalmaster can offer you, write today on your company letterhead to:

Metalmaster

DIVISION OF CLINTON MACHINE COMPANY

CLINTON, MICHIGAN

. . . Press Room Carbides, from page 136

only be obtained from a press that is maintained in good working order at all times.

The use of carbide posts and bushings or ball bearing anti-friction shoes will aid considerably in maintaining the proper alignment of dies. Mechanical strippers are usually recommended where carbide dies are employed. Stripping on the back edge of carbide nibs is not generally recommended, although it has been used with success in some instances.

The inherent density and compressive strength of sintered carbides, combined with their ability to take and hold a high polish, greatly reduce pick-up and facilitates stripping. This will allow higher press feeds than are usually experienced with a comparable grade or design in conventional steel dies. There is definite indication that the increasing use of carbides in press operations, such as blanking, will result in the design of special press equipment so that the higher speed potential of carbide die material can be fully realized.

In this regard, the Lempco press[2] is of interest. This type of equipment can operate at speeds up to 1800 strokes per minute with stock feeds of 10,000 inches per minute utilizing a fifty ton machine. However, the bulk of operations such as stamping or blanking is performed on standard press equipment, such as the vertical or inclinable press, the dieing machine or the multi-slide machine.

The correct choice of lubricants and method of application will extend the life of a properly designed carbide die or punch. Due to the varying conditions that are likely to be encountered in an individual press room, experimental work is in order. Usually, the lubricants which have been used with success on conventional steel dies will also work with equal satisfaction on dies made from carbide. In any event, it is recommended that a lubricant representative be consulted when difficulty from this source is experienced.

Grades of Carbides for Die Applications

As is the case with most carbide compositions that are commercially available, the grades employed for press room operations are primarily the tungsten carbide compositions containing appreciable amounts of cobalt as a binder. The softer grades have usually a high cobalt content which makes them suitable for applications involving severe shock or high impact.

In accordance with the published work of one leading carbide manufacturer, Table I has been included; this table indicates the composition analysis, hardness, transverse rupture and compressive strengths, and suggested condition of usage for each carbide. This table should be employed only as a guide and it is highly recommended that a carbide manufacturer be consulted regarding any specific application.

Of the five grades listed in Table I, the essential difference between them is the ratio of toughness to wear resistance. As to application, the following can be stated[2] for the various grades listed, thus:

(a) The composition identified as grade C is that type which has the widest application; well balanced shock resistance and good wear resistance are realized. Thus this composition is widely accepted as a die material for the blanking of silicon steel laminations.

(b) Where extreme hardness is required coupled with excellent edge and surface wear resistance, grade A is recommended. This grade is used successfully on smaller rolls, wear parts and die sections for blanking thin or ductile material.

(c) Carbide grade B is considerably tougher and more shock resistant than grade A, however it still exhibits good wear resistance. This grade is used successfully for slitter knives, wear resistant parts, die sections in the punching of thicker materials where a tougher grade of carbide is used in the punch, and in punches where grade A is used in die sections.

. . . Continued on page 144

Table I—Suggested Classification of Carbide for Use as Die Material

Grade	Application Characteristics	Hardness		Analysis			Strength	
		Rw "C"	Rw "A"	WC	Co	TaC	Compressive, psi	Trans. Rupture
A	Light shock, highly wear resistant.	76.0	90.5	94.0	6.0	—	480,000	260,000
B	Medium shock, good wear resistance.	73.0	88.5	87.0	13.0	—	414,000	350,000
C	Closest to the Universal grade. Combines the greatest degree of toughness and wear resistance.	72.0	88.0	85.0	15.0	—	400,000	360,000
D	Tough, not quite so wear resistant as C.	69.0	86.0	75.0	20.0	5.0	391,000	—
E	Extreme toughness, more wear resistant than high speed steel.	65.0	84.0	70.0	25.0	5.0	354,000	—

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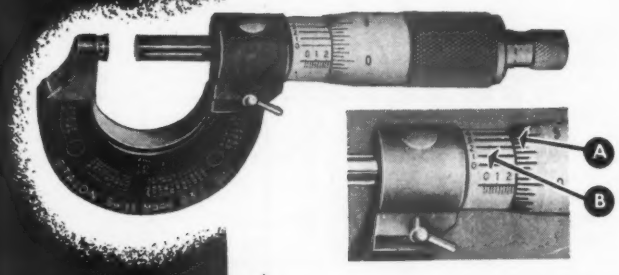

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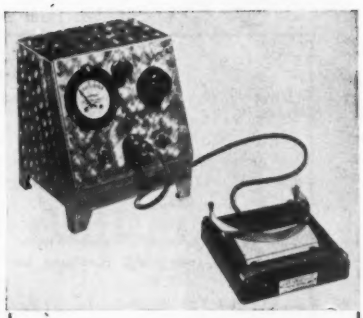

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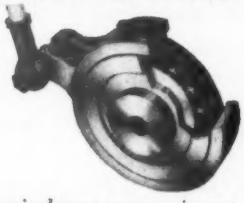

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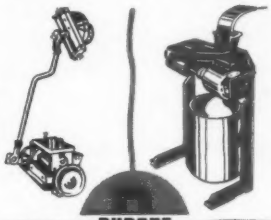

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. . . Press Room Carbides, from page 142

Slitting Knives

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Cost per knife	$ 45.00
Production per knife per grind	55 tons
Using Carbide (Composition 87% WC 13% Co):	
Cost per knife	$ 280.00
Production per knife per grind	2250 tons
Tool costs/ton/grind (steel knife)	$ 0.820
Tool costs/ton/grind (carbide knife)	0.125
Savings/ton/grind	$ 0.695
Total savings in tool cost per carbide knife per grind	$1563.75

Excluding labor savings effected by elimination of downtime, setup time, and rejections.

Courtesy: Firth Sterling, Inc.

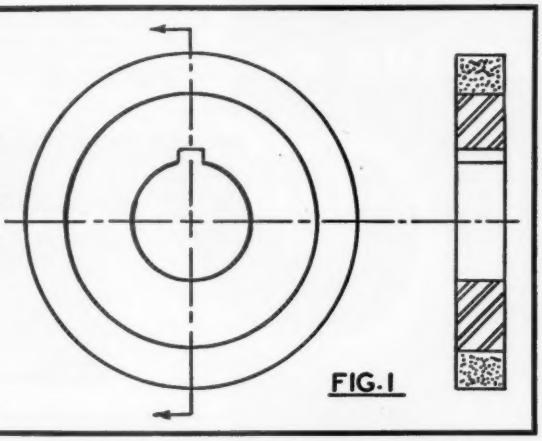

FIG. 1

(d) The grades identified as grade D and grade E are considerably tougher than either grade A or grade B. Both of these compositions, although not as wear resistant as the other listed grades, have a hardness higher than that exhibited by the hardest high carbon — high chrome die steels. These compositions are usually employed where extreme compressive stresses are encountered; grade D being recommended for such an application as coining where the restrictions to the flow of metal exert tensile or bending stresses within the unsupported carbide sections. These compositions are often employed when a greater factor of safety is required in order to offset either the inexperience of operators or worn equipment.

The increase in the use of carbide inserts in press tooling is self evident; the examples that can be given of where this material is used advantageously are innumerable. Thus, in many instances, one or more of the following advantages may be realized in the use of carbide components in die construction, namely, (a) a longer die life may be realized as compared to an identical steel die construction; (b) established accuracy and maintenance of close tolerances over a period of time not realized with comparable steel dies; (c) increased operating speeds; and, (d) reduced operating costs.

One example of savings effected through better performance and longer life between grinds is that illustrated in Figure 1. This slitting knife, which is used to slit electrical grade silicon steel into strips of predetermined width, was made from an eighty-seven percent tungsten carbide and thirteen percent cobalt; this being comparable to the grade B composition listed in Table I.

Another example is the use of carbides as inserts in the construction of a progressive die employed in the blanking of commutator segments. In this instance, the copper commutator segments are blanked from hot rolled stock directly from the mill. This job employs automatic feed on a Bliss press operating at a speed of 240 strokes per minute. The soft copper stock is 0.188 inches in thickness. The punch had been made from a carbide; the composition being seventy-five percent tungsten carbide, five percent tantalum carbide and twenty percent cobalt. This punch material is quite tough and corresponds to grade D, Table I. The die inserts were made from a carbide corresponding to grade B, Table I.

In this specific instance, a high carbon —high chrome steel die was employed previous to the use of carbide inserts; producing 50,000 parts per grind with a life of 15 regrinds or a total of 750,000 finished parts. The carbide die produced 1,250,000 parts per grind and was still in operation at the last report. In addition to the above performance, it should be noted that it was necessary to remove approximately 0.020 inches per grind on the steel die whereas, the average stock removal on the carbide insert die component was but 0.003 inches per grind.

References

1. "Tungsten Carbide Blanking Dies", E. J. Reitler and C. R. Harmon, Firth Sterling Inc., Pittsburgh, Pa.
2. "Diecarb—Grades, Application, Design and Maintenance", Tech. Data. 70-001, Firth Sterling Inc., Pittsburgh.
3. "Cemented or Sintered Carbides", L. J. Hull and D. L. Schwartz, Metals Handbook, 1948 ed., pp 59-63, Amer. Soc. for Metals, Cleveland, Ohio.
4. "Carbide Dies offer High Production Blanking and Piercing", A. E. Glen, Tooling and Production, June 1952.
5. "Carboloy Die Engineering Manual", D-24, Carboloy Co. Inc., Detroit, Mich.
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(To be Continued)

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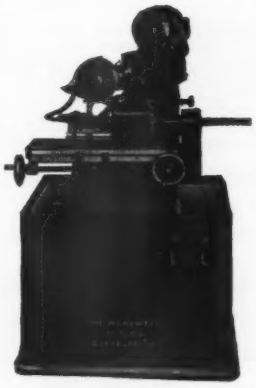

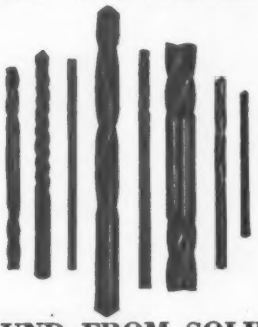

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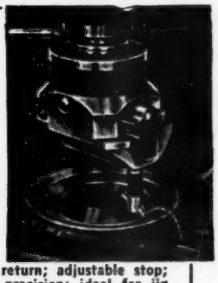

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. . . Multi-Slides, from page 138

clip are formed but have not been closed to the required shape.

The closing of the two legs is accomplished at the next stroke of the machine when the stripper mechanism transfers the partially formed blank from the center forming position to the third and lower level, where the closing of the two legs of the clip is accomplished.

At all times, three blanks in various stages of completion are in the forming position, one above the other. Each part is transferred to the next lower level, and the finished form is automatically stripped from the post by the part moving down from above. With this type of setup, a completely formed clip is produced at each stroke of the machine.

Tool Planning & Design

The principles followed in designing dies for Multi-Slide Machines are similar to those employed in laying out progressive dies for conventional punch presses. There are, however, several characteristic differences resulting from the design and principles of operation of the machine itself.

It is standard practice to employ sectional construction for the dies, the sections being form ground. Sectional construction permits minimum clearance and draft (relief) in die openings. Since the ram movement on the Multi-Slide is horizontal, slugs are pushed through the die in upright position and the reduced clearance prevents the slugs from pulling back with the punch. Minimum draft results in greatly extended die life, because more sharpenings can be made before the die opening loses size appreciably.

Since a number of rams can be used simultaneously, the work load may be better distributed. The designer is able to lay out dies with working stations spaced in such manner that frail punches are not crowded into a small area.

In cases where work can be spread between four rams instead of being handled with one, it will often be easier to build and set up four smaller dies than one long and heavy progressive die. The is an important point to consider in initial setup and also in changeover. Furthermore, with four separate dies, it is simple to incorporate changes or modifications in any particular stage; and, repair of any one stage is easier since it is unnecessary to remove and perhaps disassemble a large complex progressive die.

Die inserts, punches, and forming tools are

. . . Continued on page 186

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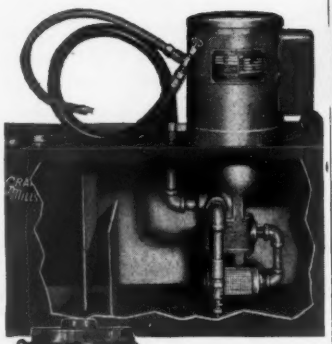

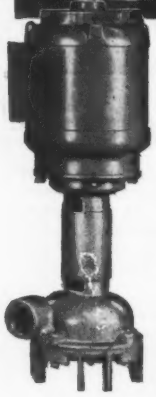

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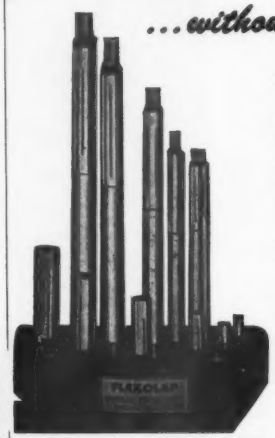

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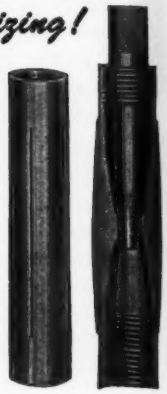

Illustrated at left is Flexolap Set No. 1. Includes 6 complete laps, one of each size (3/16", ¼", 5/16", ⅜", 7/16" and ½"), and one additional brass barrel of each size, all held on a sturdy, serviceable stand. Price complete $14.00

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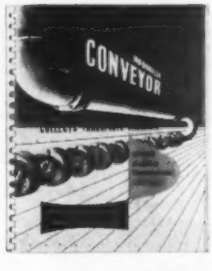
The Story of Resistance Welding is pictorially told and the basic components of electronic controls for regulating heat are explained in a bulletin now available from General Electric Co., Schenectady 5, N. Y. The booklet begins with a description of the process of joining metals by this method. It informs the reader, also, what metals are suitable for resistance welding, plus the steps in making a weld and the principal types.

Also presented is a description of accessories, along with a list of applications for this type of welding. Explanation of electronic controls included. **Inform-A-Gram No. C2.**

CASE STUDIES ON ABRASIVE-BELT METHODS which effected savings on machine operations are presented in a 32-page booklet, "Wherever There's Industry," recently published by Porter-Cable Machine Co., 23 Exchange St., Syracuse, N. Y. More than 100 illustrations help depict new abrasive-belt methods. Inform-A-Gram No. C3.

A Two-Page Chart devoted to general engineering types of steel castings, classified according to tensile strengths, is included in a manual on "Carbon and Low Alloy Steel Castings," offered by the Steel Founders' Society of America, 920 Midland Building, Cleveland 15, Ohio. Also incorporated in the report is material covering steel casting properties, specifications, design, joining, heat treating and inspection procedures. **Circle No. C4.**

Important, Up-To-Date Information on automatic material handling conveyors is now available in a new comprehensive 20-page catalog published by the Honan-Crane Corp., 208 Indianapolis Ave., Lebanon, Ind. The colorful, plastic-bound booklet describes and illustrates all types of Houdaille conveyors for automatic, continuous removal of metal-working chips, scale, sludge, cracklings, powders, grain, etc. Also included are easy-to-read capacity charts, circuit layout suggestions, helpful installation and operating instructions. **Circle Inform-A-Gram No. C5.**



A TAP MANUAL, giving the latest unified and American screw thread information, has been prepared by the Threadwell Tap & Die Co., Greenfield, Mass. Included in the booklet is information on tap and thread terminology. Circle Inform-A-Gram No. C6.

A Textbook On Hydraulic Pumps and Valves, their maintenance and repairs, is now available to industry, colleges, high schools, and vocational schools throughout the United States and Canada at $2 per copy from Vickers Inc., 1450 Oakman Blvd., Detroit 32, Mich. The manual also includes information on the practical application of hydraulics to machines for the control of speeds and feeds.

An analysis of Pure Molybdenum Disulphide in regards to it being used as a lubricant is discussed in a paper distributed by the Alpha Corp., 179 Hamilton Ave., Greenwich, Conn. Complete with a series of graphic illustrations, the report covers the compound's chemical stability, electrical properties, purity, anti-corrosion properties, thermal stability, coefficient of friction and the various methods of application. **Inform-A-Gram No. C7.**

THE LATEST ISSUE OF GRITS AND GRINDS, published by the Norton Co., 3 New Bond St., Worchester 6, Mass., includes articles on cylindrical, centerless, surface and thread grinding plus an item on toolroom wheels. Also incorporated in the booklet is information on a recent Norton development, the "G" Bond wheel for precision and semi-precision grinding operations.
Circle Inform-A-Gram No. C8.

Stryon 475, a high impact polystyrene formulation is now being produced in sheet form in a variety of sizes and thickenesses. How this product can be converted into useful articles by stamping, embossing, vacuum and pressure forming methods is explained in a bulletin offered by Dow Chemical Co., Midland, Mich. The booklet also gives data, including schematic diagrams, on how the material can be fabricated by methods used for forming thermoplastic sheet.

At the present time most parts are fabricated by either vacuum or pressure forming methods. Other technical service bulletins on Stryon are available upon request.
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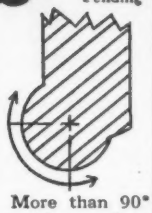

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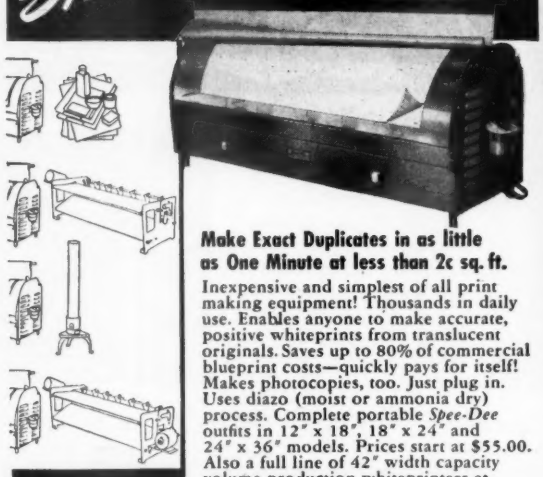

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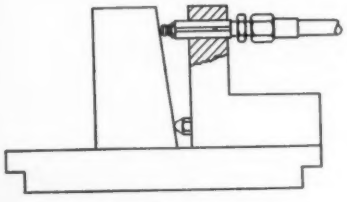
Multi-purpose Gaging Unit Can Be Tailored to a Variety of Jobs

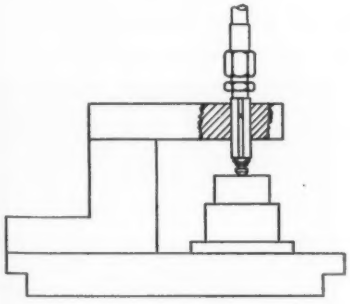
These illustrations suggest the versatility in application of an "air cartridge unit" developed by Pratt & Whitney, Division Niles - Bement - Pond Company, for use in conjunction with their Air-O-Limit gages.

The unit can be used in both single and multiple station fixture-type gages much the same as dial indicators can be used. Practical applications include checking such factors as squareness, height, contour, concentricity, flatness, and depth.



SQUARENESS

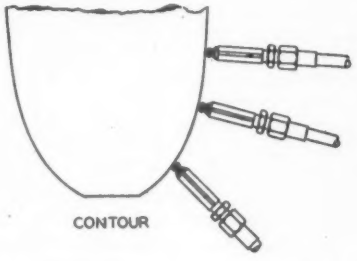
Internal and external average diameters can be checked by using multiple cartridge units in a gaging plug or ring. Many large diameter parts have broad out-of-round tolerances and must be measured for average diameter which can be readily accomplished by using the units in multiple.



HEIGHT

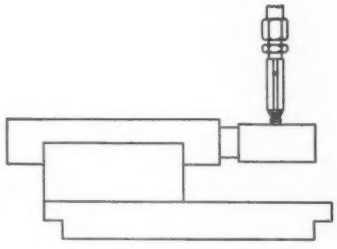
The unit can be applied to machine tools to indicate run-out. As a direct size indicator it will give the operator an indication as the finished dimension is approached.

Height gage applications in connection with surface plates, can be made by mounting the cartridge on a height gage stand and using it in conjunction with a standard P & W Model "F" comparator.



CONTOUR

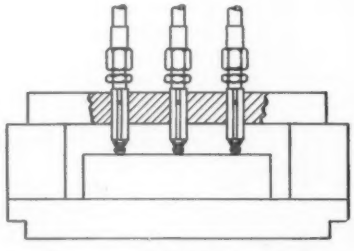
The unit consists of a plunger with a contact point on one end and a stainless steel ball on the other end operating with axial movement in the cartridge body. Air flow through the cartridge unit is restricted by the ball on the plunger operating in a tapered hole in the body, thus



CONCENTRICITY

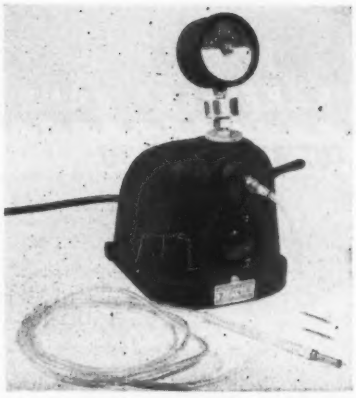
setting up back pressure required to operate the Air-O-Limit gage. A light contact of only three ounces is all that is needed to operate the unit.

The broad scale air cartridge unit, when used with an Air-O-Limit gaging fixture, is correctly calibrated by means of a set of

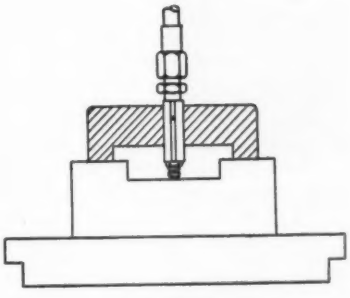


FLATNESS

minimum and maximum feeler gages, thus eliminating the necessity of expensive calibrated masters. Once magnification is established with the feeler gages it may be applied to any fixture and zeroed with a simple setting master or even a measured product.



This Air-O-Limit gage can be equipped with an extension air cartridge unit. The air cartridge units in turn can be incorporated into a great diversity of fixtures to perform a multiplicity of inspections as suggested by the accompanying sketches. The standard air cartridge units, made primarily for wide tolerance work, are available in three magnification ranges operating over total scale readings of 0 to .010", 0 to .015", and 0 to .020". Units can also be furnished having total scale readings ranging from .0006" up to .003". The compact air cartridge unit is only 1¾" long and ⅜" in diameter.



DEPTH

Small and compact, the air cartridge unit measures only 1¾" long and ⅜" diameter. The back of the unit is threaded to fit the standard Natvar tubing for connection to the comparator.

Standard air cartridge units are made primarily for coarse tolerance work and are available in three magnification ranges operating on total scales of .010", .015", and .020". However, units can also be furnished for total scales ranging from .0006" up to .003".

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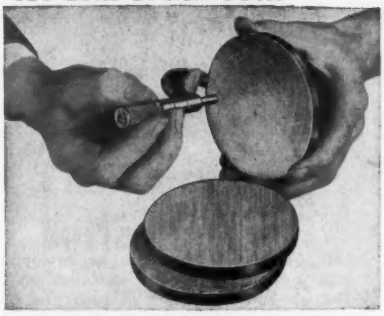

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Atlantic
ATLANTIC SAW MFG. COMPANY, Inc.
BREWERY STREET New Haven Connecticut

. . . Automation, from page 109

the machine must complete its cycle with the one circuit initiation.

In addition to the terminal wiring previously mentioned, approximately twelve extra terminals should be provided in the control panel to receive automation wires. These wires will accommodate the following interlock contacts:

1. Insert a normally closed contact from the automation shuttle "Forward" relay in the machine "Fingers Engage" circuit or equivalent. The purpose of this contact is to prevent machine elements from entering the loading area while the automation shuttle is moving forward. Normally this will have value only during manual or push-button operation.

2. Insert a normally closed contact from the unloading automation shuttle "Forward" relay in the transfer circuit of the machine to prevent machine indexing while the unloading automation shuttle is moving forward.

3. Insert a normally closed contact from the machine transfer forward relay in the unloading automation shuttle "Forward" circuit to prevent the shuttle from moving while the machine is bringing a part into its unload station.

These electrical conditions are outlined on an attached sheet showing one arrangement for an automatic starting circuit.

With automation serving a series of in-line transfer machines it would be convenient for operating personnel, if all push button panels were located on the right hand side of the machine. This side of the machine being determined by facing in the direction of part movement.

Naturally, all of the suggestions presented here will probably not be applicable to every machine. Future coordination between machine and automation designers will result in more efficient, economical and reliable operation of the automated line.

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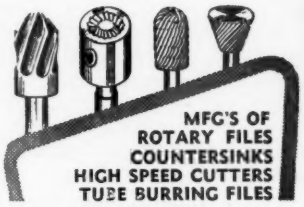

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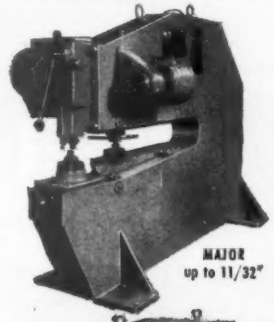
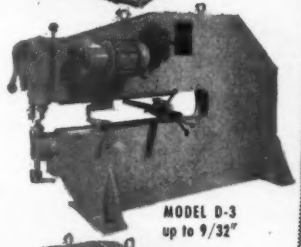
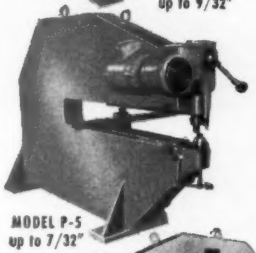


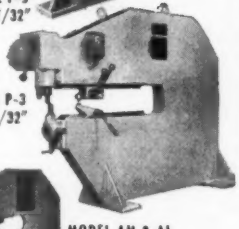
MAJOR up to 11/32"



MODEL D-3 up to 9/32"

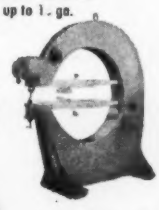


MODEL P-5 up to 7/32"



MODEL P-3 up to 5/32"

MODEL AM & AL up to 1. ga.



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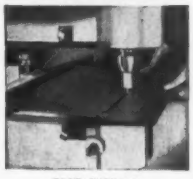
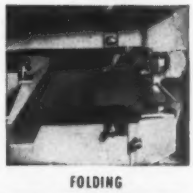


SLOT CUTTING

BEADING



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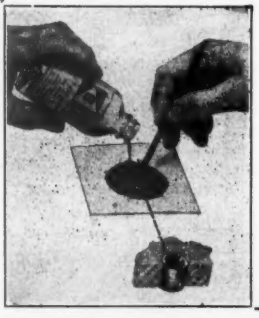

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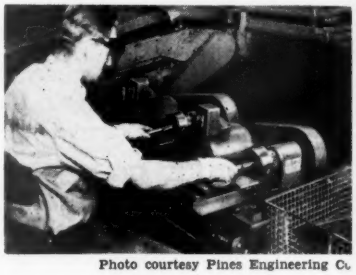

Photo courtesy Pines Engineering Co.

Single Foot Control Actuates Both Machines

The machines are bench-mounted adjacent to each other. One man operates both machines simultaneously by means of a single foot control which initiates the automatic clamp, feed, and return cycle for both machines. This arrangement frees the operator's hands for loading and unloading purposes.

The machine at the operator's left is especially tooled to handle an inside and outside deburring and facing operation on one end of the tubing. As soon as this operation is completed, the operator flips the workpiece a half-turn, catches it in mid-air with his right hand, and loads the second machine which performs the same operation on the opposite end of the workpiece and also faces it to length. At the instant the second machine is being loaded, the operator's left hand is free to reload the first machine and maintain uninterrupted operation. To further simplify production cycling, the work pieces are supplied to the operator from a main conveyor line and finished pieces are dropped into a nearby basket.

Extremely Close Tolerances on Length Maintained

Because precision tolerances on length are needed in this

. . . *Continued on page 179*

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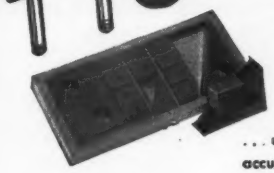

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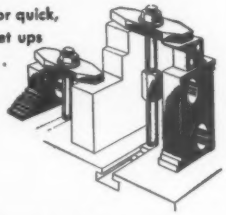
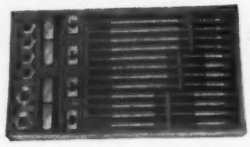


and HANDY STUD SETS



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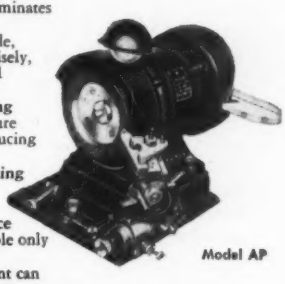

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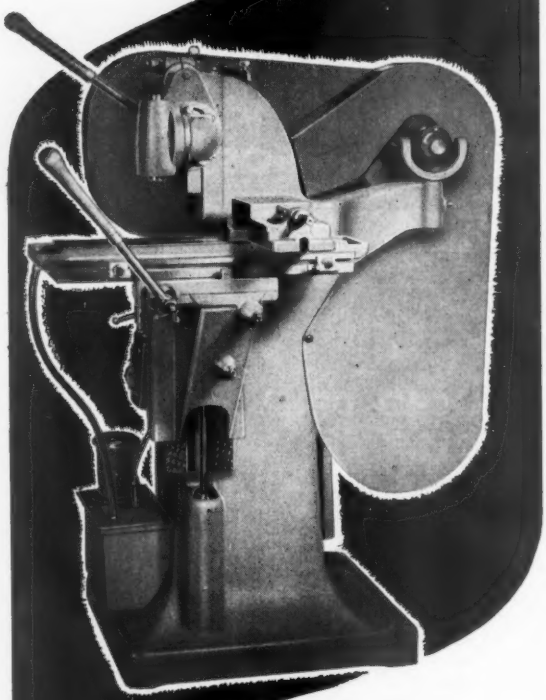

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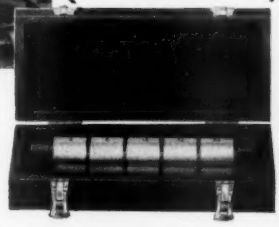
Check Surface Roughness Waviness and Lay INSTANTLY

. . . Right At The Machine

With ACME'S ROUGHNESS COMPARISON SPECIMENS



Consists of various surface specimens, *individually finished* to definite micro-inch readings, grouped together in one handy comparison bar. Merely hold bar opposite work for fast, visual comparison check of surface roughness, waviness and lay.

Available in groups of 3, 5 and 8 specimens. Low cost. Write for details, now!

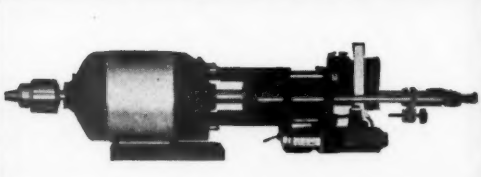
Mfr's. of Drill Jig & Fixture Bushings

ACME INDUSTRIAL COMPANY

206 N. Laflin St. Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR OVER A QUARTER CENTURY

New **BLACK** SELF-CONTAINED DRILLING UNITS



NO SPLINES — Self-contained units, at low cost, for drilling, tapping, chamfering, reaming and similar operations.

NO GEARS — New principle employs traversing motor shaft for work spindle, applies even torque with practically no end play. Drill has air feed for rapid advance to work—hydraulic control to completion of work cycle with uniform feed. Tapping unit controlled so tap follows its own lead without chamfering first thread or stripping threads on return stroke. Easy adjustment—depth accuracy to within .001".

NO CAMS

NO CLUTCHES

NO REVOLVING WEIGHTS — Operate in any position. Wide range of speeds and sizes.

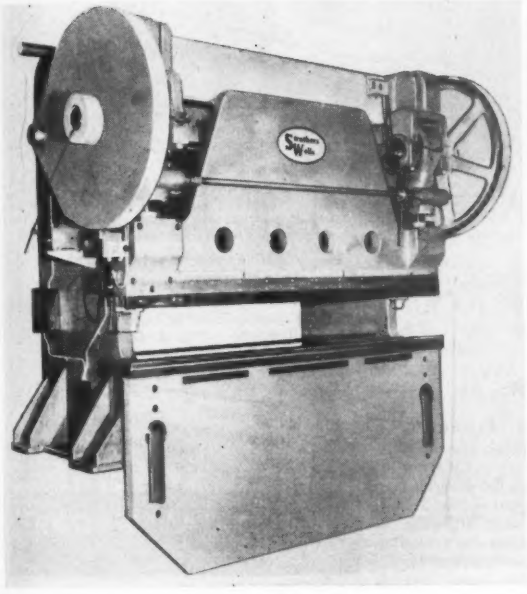
Write for complete information

BLACK DRILL COMPANY, INC.
1368 EAST 222nd STREET • CLEVELAND 17, OHIO

PROGRESS ON PARADE

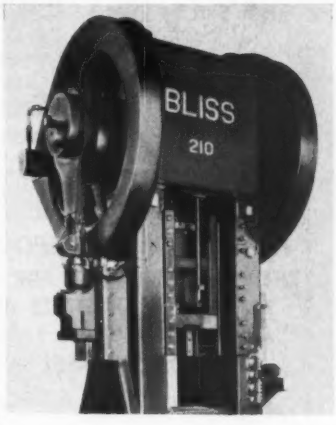
NEW DEVELOPMENTS • IMPROVEMENTS • COST AND TIME SAVERS — Mail FREE Inform-A-Gram Card for MORE Details.

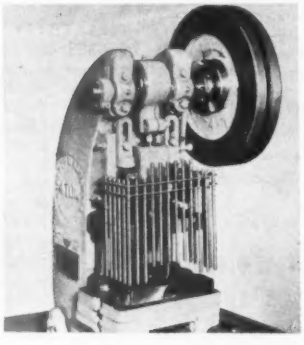
in the 7th Annual PRESS, DIES & STAMPINGS Feature Issue



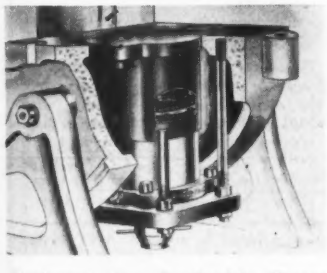
A new 400-ton capacity press brake has been added to the line of sheet metal forming equipment manufactured by Struthers Wells Corp., Machinery Division, Titusville, Pa. Designated Model 400-PB-8, this latest development forms steel up to ¾" in thickness and 8' in width. Provided on the new unit is a pneumatic clutch and separate brake. Circle No. A1.

A New Line of Trimming Presses, featuring the streamline box-type crown construction, has been developed by E. W. Bliss Co., Canton, Ohio. The single-geared presses in the line are four-piece frame welded steel construction with twin herringbone driving gears running in oil and equipped with rim-type oil tight gear guards. Among the features are an air counterbalance concealed in the uprights, automatic lubrication and the Bliss fast-acting, cool-running friction-type clutch. **Circle Inform-A-Gram No. A4.**





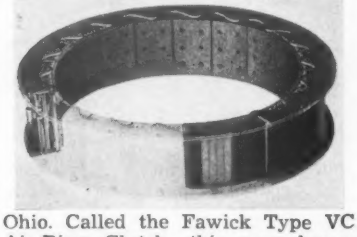
A Universal Punch Press Safety Guard is now being manufactured by Benchmaster Mfg. Co., 1836 W. Rosecrans Ave., Gardena, Calif. By dropping numerous vertical rods (the number depends on size of bolster plate) through any pair of pre-located holes in horizontal guard plates, a protective cage is set up around die area.
Circle Inform-A-Gram No. A5.



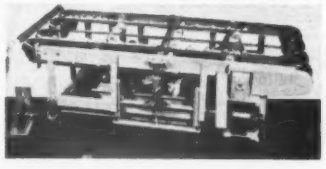
Designed For Inclinable Presses is the new Model DB Full Universal die cushion manufactured by Dayton Rogers Manufacturing Co., Minneapolis 7, Minn. This new type installation is completely self contained and can be used with or without surge tank. **Circle No. A2.**

For Smoother Action, Longer Life and less wear on punch press ram clutches a new line of power press counter balance cylinders has been introduced by Dayton Mfg. Co., Minneapolis 7, Minn.
Inform-A-Gram No. A3.

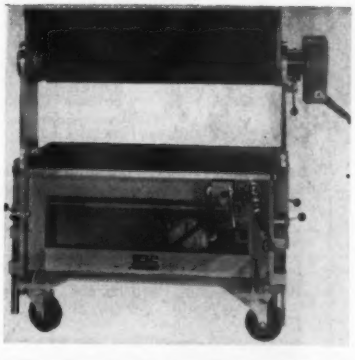
A New Air-Operated Industrial Clutch is now being manufactured by Federal Fawick Corporation, 9919 Clinton Rd., Cleveland 11,



Ohio. Called the Fawick Type VC Air-Ring Clutch, this new heavy duty unit is completely ventilated and provides for transmission of power from the friction shoes through the torque bars to the metal side plates of the assembly. **Circle Inform-A-Gram No. A7.**



Pictured below is a portable die handler made by Hansford Mfg. Corp., 1239 University Ave., Rochester 7, N.Y. It is now available with a motorized lift attachment for rapid movement of upper section. **Inform-A-Gram No. A6.**



A sheet and strip handling machine to support narrow strips as they are cut by shear is a new product of the Fried Steel Equipment Mfg. Corp., 528 E. 119th St., New York 35, N.Y. Machine (left) is shown in conveyor position.
Circle Inform-A-Gram No. A8.

SEE ADVERTISERS INDEX, BACK OF BOOK, FOR INFORM-A-GRAM KEY NUMBERS

STOP SCALE AND DECARBURIZATION THE EASY WAY!!

3 BIG ADVANTAGES PROVE

PHOENIX BRAND
TRADE MARK REG U.S. PAT OFF

NON-SCALING COMPOUND

THE PERFECT METHOD FOR HEAT TREATING TOOL STEELS AND ALLOY STEELS UP TO 1650°F!

SAVES TIME!

Simply coat piece to be treated — then harden or anneal as usual. It's that quick! This dry, easy-to-handle powder is applied in a jiffy — saves hours of costly finishing.

IMPROVES RESULTS!

Each finished piece is a shining example of production excellence. Phoenix Brand Non-Scaling Compound seals air out — assures *bright, pitless, scale-free* surfaces every time. Protective coating is removed in a flash — if necessary, just boil in plain water.

SAVES MONEY!

Polishing and grinding are virtually eliminated! Rejects are reduced! Furnace capacity and production increase — there's no cumbersome packs to crowd furnace.

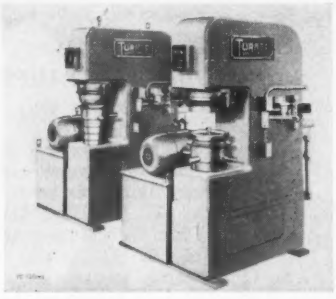
Prove to yourself that Phoenix Brand Non-Scaling Compound can end your heat treating headaches for good — order a trial supply TODAY!

2 Lb. can .....$ 6.00
5 Lb. can $15.00
15 Lb. can $41.25
25 Lbs. or more..$ 2.50 per Lb.

Available from your local distributor or

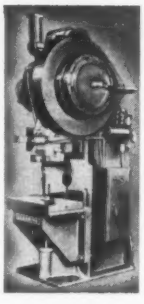
THE PARKER STAMP WORKS, Inc.
Established 1871
HARTFORD, CONNECTICUT

A 50-Ton Hydraulic Press is now being manufactured by Turner Bros., 2625 Hilton Rd., Ferndale, Mich. The press has been specifically designed for accurately maintaining center distances in assembling inner portions of fluid couplings. The ram on the assembly press is set with an indicator, the stroke being electrically and hydraulically controlled so that the assembly of the coupling members is accurately maintained.



Circle Inform-A-Gram No. A9.

THE VERSATILITY OF CLEARING HORN PRESSES are emphasized in a new catalog now available from Clearing Machine Corporation, 6499 West 65th St., Chicago 38, Ill. The booklet contains complete specifications for the entire press line as well as cut-away drawings showing engineering details. These machines readily lend themselves to being equipped with special bolsters, work tables and feeding attachments.



Circle No. A10.

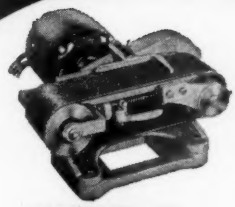
Precision Vernier Calipers are now being offered in a new and improved line by Homestrand, Inc., Larchmont, N. Y. Re-designed for more handling ease, convenience and accuracy, the newest line of instruments features fitted adjustable Vernier plates, both measuring scales on one face of the tool and double-spaced Vernier graduations.

Circle No. A11.

SELF - LOCKING - SPRING - PIN FASTENERS are being manufactured by a new division of Standard Pressed Steel Co., Jenkintown, Pa. Known as the Sel-Lok spring pin, the fasteners replace tapered, grooved and dowel pins in all kinds of assemblies.

Circle No. A12.

DOES IT BETTER
DOES IT FASTER



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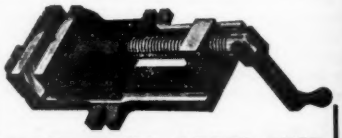
ABRASIVE BAND GRINDER

The precision of a machine tool plus the durability of a workhorse. Complete with ½ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING WRITE TODAY

WALLS SALES CORP.
333 Nassau Avenue, Brooklyn 22, N. Y.



YOST DRILL PRESS VISE

● This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

OFFERED IN TWO SIZES

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12¼
2D	5	5½	23

Do you need a vise of ANY type? *Write today for bulletin on the extensive Yost line*

YOST MFG. COMPANY
1000 MAIN STREET
Meadville • Pennsylvania

DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Penna.

NOW greater versatility
greater efficiency

with Wells Metal Cutting Band Saws

featuring an Expanded Range of Cutting Speeds

TO IMPROVE cutting efficiency and production, three models of the Wells Metal Cutting Band Saw line are now available with expanded range of cutting speeds as standard equipment.

The new cutting speeds coupled with such proved Wells advantages as sturdy construction, ease of operation, real dependability and low cost make these machines even more profitable for you to use. Ask your Wells Dealer for full information or write, requesting catalog G-52 giving specifications and design details for all models.

Wells

Products by Wells are Practical

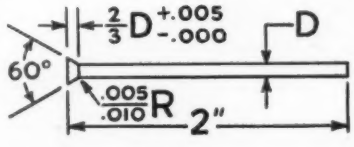
METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1040 CEDAR ST., THREE RIVERS, MICH.

Can you make your own at *TWICE* the price?

±.0003" centerless ground
PERFORATING PUNCHES

Save time, money, detail work. Use standard precision Perforating Punches—tough, durable, 57 Rc hard, with square, sharp cutting ends—for a few cents apiece. Heads are annealed with plus tolerance for finishing. 2" long in sizes up to .125"; all others 2½". In stock for immediate delivery: Diameters .024" to .110" inclusive in .001" steps; also .125", .128", .130", .141", .156" and .1875". Write for full details.

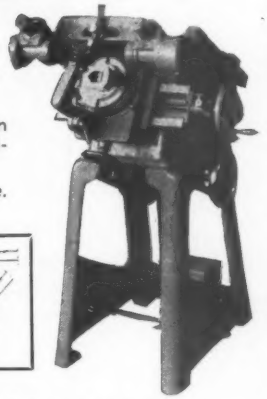


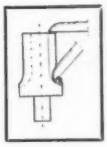
ROSS TOOL COMPANY
82 St. Paul Street, Rochester 4, New York

Punches Shaped from the SOLID with OTTMANN Punch Shaper

FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.



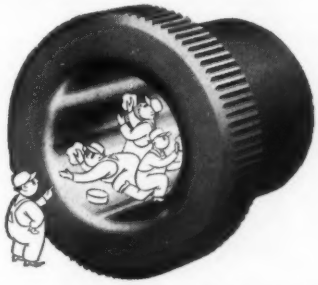


5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.

Write for Literature

CEDAR-WEST TOOL CO., INC.
90 WEST ST. NEW YORK 6, N. Y.

SUPER FINISH OF UNIVERSAL DRILL BUSHINGS reduces tool wear to a minimum



One sure way to cut excessive tool wear in your operations is to specify Universal Drill Bushings because their superfinish bores help reduce wear on production tools to an absolute minimum, especially in close tolerance work. The blended radius on the top inside diameter helps prevent tool hang-up and breakage. 100% concentricity and hardness tests insure accuracy, uniform high quality and long life. Knurled heads provide a quick, sure grip. Universal Drill Bushings are produced in a complete range of standard sizes and lengths. Orders for special dimensions will receive prompt attention. For complete information, write to the office nearest you—Universal Engineering Sales Co., 1060 Broad St., Newark 2, N.J.; 5035 Sixth Ave., Kenosha, Wis. — or our home office.

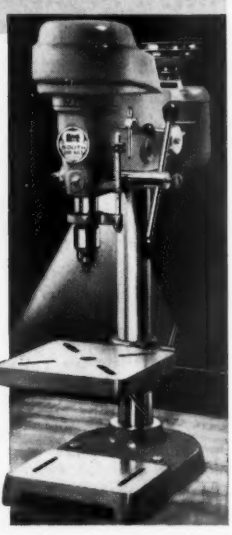
UNIVERSAL ENGINEERING COMPANY
FRANKENMUTH 8, MICHIGAN
171-A

ECONOMY

14"
South Bend Economy Model Bench Drill Press

Ruggedly constructed for machine shop service. Drills to center of 14-1/4" circle. Free-floating spindle. Four precision ball bearings. Time payment plan is available.

PRECISION



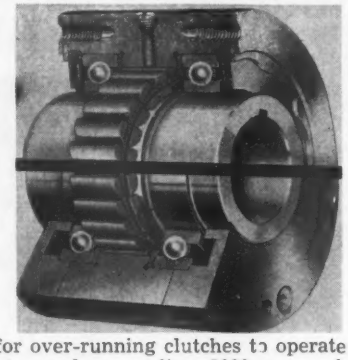
For greater precision, maximum convenience and more satisfaction select the South Bend Precision Model 14" Drill Press. Has built-in work light, free-floating spindle, four precision ball bearings, adjustable quill bearing, quick-acting belt tension release. 1/3 or 1/2 h. p. vertical mounting motor required. Time payment plan available.

South Bend also makes several types of multiple spindle drill presses for production operations — write for information.

Write for catalog of 14" Drill Presses. Also, 9" to 16-24" Lathes, Lathe Attachments, 7" Shapers — specify machine interested in.

SOUTH BEND LATHE
South Bend 22, Indiana
Building Better Tools Since 1906

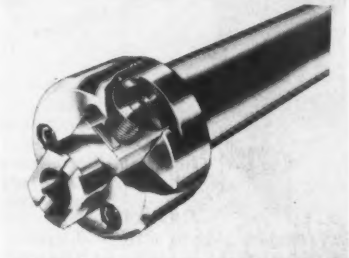
A New Development by the Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich., makes it possible



for over-running clutches to operate at speeds exceeding 3000 rpms. A centrifugal throwout sprag assembly eliminates any possible rubbing between the sprags and inner race. This new feature is available in the firm's all-purpose ballbearing clutch. **Circle Inform-A-Gram No. A13.**

A NEW TYPE LIGHT REFLECTOR that screws right into any standard light socket has been announced by Abolite Lighting Division, Jones Metal Products Co., West Lafayette, Ohio. This "Jiffy-lite" has a two-piece plug and socket. The bulb screws into the reflector which in turn screws into light socket. No tools are needed for installation. Circle Inform-A-Gram No. A14.

Heavy Duty Offset Boring Chuck recently introduced by Last Word Sales Co., 185000 Mt. Elliot, Detroit 34, Mich., is reported to have a patented, positive dead-centering



feature for drilling and milling, which eliminates the necessity of chuck removal. Last Word claims this feature facilitates quick, time-saving tool changes and makes possible extreme accuracy in boring, drilling milling and similar tool operations. **Circle Inform-A-Gram No. A15.**

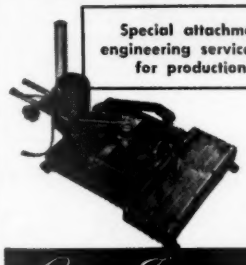
The Green Engraver

ENGRAVES
ROUTS
PROFILES
and MODELS

Used and endorsed by tool and die, electronic, machine, plastics, radio, electrical and instrument manufacturers. A real money saver.

Specify the Green Engraver for precision engraving on metal, plastics, wood, glass, hard rubber etc. . . . engraves panels, name plates, scales, dials, molds, lenses, instruments, instruction plates, directional signs . . . by simple tracing from master. *Routing, profiling and three dimensional modeling indicate its versatility.* Electric etching attachment available.

Special attachments and engineering service available for production work.



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INCORPORATED
330 PUTNAM AVENUE · CAMBRIDGE · MASS.

NEW NESTING TYPE
TOTE PANS

Sturdy 16 ga. metal. 20" long x 12" wide x 6¼" deep. Drag holes and handles at both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

JIG BORING

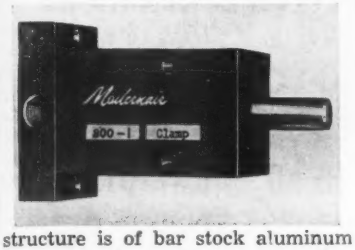
Done to your specifications

We Have
12 Jig Borers

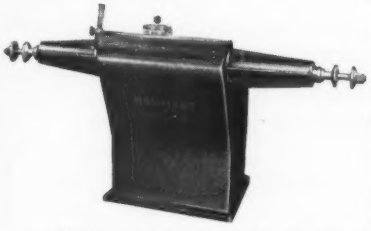
Including the largest Pratt & Whitney made

BLOOMFIELD TOOL CORPORATION
30 Farrand St. Bloomfield, N. J.

Clamp Type Single-Acting Air Return Cylinders (series 800) are now being made by Modernair Corp., 400 Preda St., San Leandro, Calif. These 1⅛" bore cylinders are produced in 1 and 2" stroke models. Body

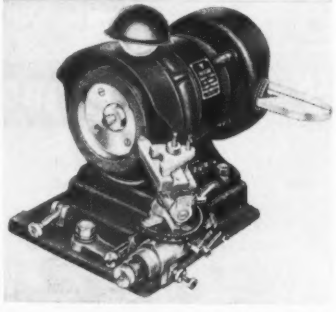


structure is of bar stock aluminum as is mounting end plate. Mounting holes are provided for horizontal mounting. The piston rod is of stainless steel, piston of brass and the seal is a standard "O" ring. A bronze bushing is provided for guiding the piston rod.
Circle Inform-A-Gram No. A16.



A NEW POLISHING AND BUFFING LATHE has just been added to the wide line of products by Hammond Machinery Builders, Inc., Kalamazoo, Mich. Shown above is the firm's 10 HP Model 10 VROW lathe which has variable speeds of 1500 to 3000 rpm.
Circle Inform-A-Gram No. A17.

A Moderate Priced Precision Grinder described as capable of producing perfect keen cutting edges and exact angles on all types of

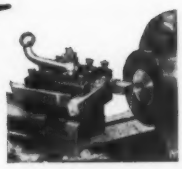


modern cutting tools, is the newest product of Thomas Prosser & Son, 120 Wall St., New York, N. Y. Some of the features of this unit are: the tool is rocked back and forth ac oss the wheel face, eliminating scoring and grooving; front, side and top angles can be set prescisely in both vertical and horizontal planes; rigid pressure and overheating is eliminated.
Circle Inform-A-Gram No. A18.

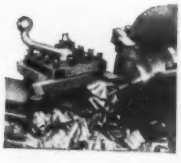
Enco
TURRET TOOL POSTS
SAVE VALUABLE SETUP TIME

The three photos at right illustrate the flexibility of 12-position indexing, whereby each tool may be used in three different working positions.

- √ Accurate within .0005.
- √ 12 position indexing.
- √ Hardened steel construction.
- √ Mounts rigidly in compound T-slot.
- √ Keeps setting accurately.
- √ Indexing is self-contained—eliminates all chip-interference.



¾" square tool bit mounted in Model 4½-S turret used for facing cut.



The same tool used for broadface turning merely by indexing turret one position or 30°.

Manufacturers of the most complete line of HEXTURRET BED TURRETS, TURRET TOOL POSTS and TAILSTOCK TURRETS in the country. Send for Catalog No. 53.

Same tool used for inside chamfer merely by indexing back two positions or 60°.

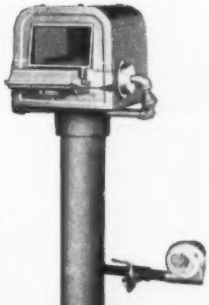
ENCO Manufacturing Co., Dept. 773
4524 W. FULLERTON AVE., CHICAGO 39, ILL.
Reasonable Deliveries

SPEED PRODUCTION

ELIMINATE DELAYS with
Quick Acting JOHNSON Furnaces

Heat treat high speed steels
Harden high carbon steels
Braze carbide tipped tools

JOHNSON No. 120 Hi-Speed



Heat treat tools, dies and small metal parts in your own plant. Quick Acting JOHNSON No. 120 Hi-speed delivers 1500° F. in 5 minutes, reaches 2300° F. in 30 minutes. Gets the job done fast to save time and gas. Temperatures easily regulated with accuracy. Firebox 5 x 7¾ x 13½. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.
$145.50 F. O. B. Factory

There is a Quick Acting JOHNSON Unit for every toolroom and shop. Write for complete catalog. Johnson Gas Appliance Company, 575 E Avenue N.W., Cedar Rapids, Iowa.

JOHNSON Since 1901
FURNACES FOR INDUSTRY

DEALERS Write for Our PROPOSAL

The BARKER "MILLER"

PRECISION - PRODUCTION - ECONOMY

PRODUCTION MODEL

Exclusive 3-Way Travel

Pre-loaded, double row ball bearing spindle. Various spindle speeds available with different pulley combinations.

at a rapid rate by inexperienced operators. Easy set-up for small run jobs.

Second to none.

Priced Under $350.00

Complete as Shown, Ready to Operate.

MASSIVE, HEAVY HEAD and table to allow fast cuts without chatter.

You can easily effect a 50% economy in the milling costs of small parts with this versatile machine.

Designed and built for holding close tolerances on big run jobs. Hundreds in use in large plants from coast to coast.

The "BUY"-WORD for small parts milling jobs is "BARKER MILLER."

WRITE FOR LITERATURE AND COMPLETE INFORMATION

BARKER ENGINEERING COMPANY 500 GREEN ROAD CLEVELAND 21, OHIO

FRICTION SAWING WITH Tannewitz HIGH SPEED BAND SAWS

GREATEST COST SAVER IN METAL CUTTING

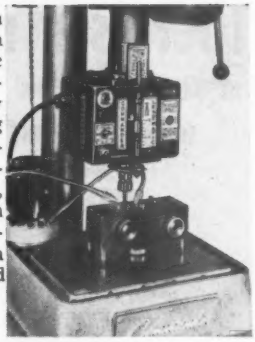
Tremendous savings of time and money are effected in trimming formed parts with Tannewitz High Speed Band Saws, for not only are the cuts made exceedingly fast, and smoothly, but in most cases no jigs or rests of any kind are required. Sheets of both hard and soft steel, and even such metals as 1" armorplate are handled with great advantage by this method, and it is ideal for trimming malleable and steel castings. By all means get the complete facts and learn of the many opportunities for boosting production and lowering costs that Friction Sawing with Tannewitz High Speed Band Saws offers. Write for circular.

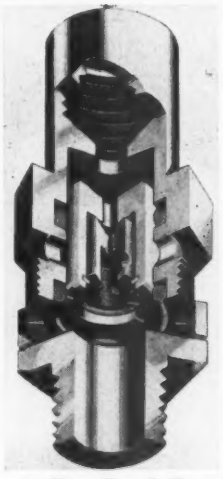
for trimming castings of all metals write for bulletin on "Foundry Band Saws".

SAWING MACHINERY SPECIALISTS

The TANNEWITZ WORKS GRAND RAPIDS MICHIGAN

High Production Precision Tapping is simplified with the "Lead-Matic" automatic lead screw tapping attachment recently introduced by Commander Manufacturing Co., 4225 W. Kinzie St., Chicago 24, Ill. Controls are located on the face of the unit, permitting easy selection either by hand, foot or fixture switch. The unit has a range of #0 to 3/4 inch and fits any drill press.
Inform-A-Gram No. A19.

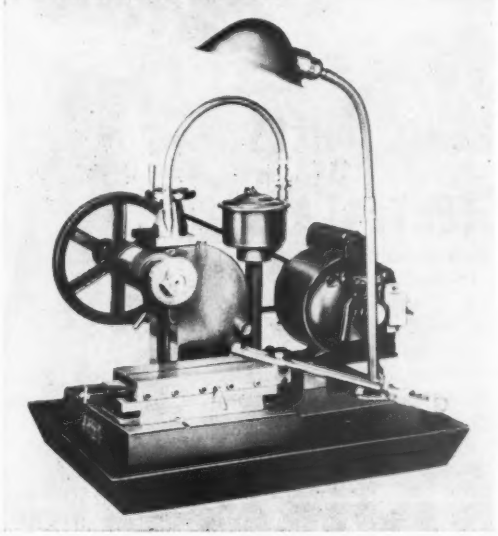




A Quick Release Valve guaranteed not to chatter is now being produced by Deublin Co., Glenview, Ill. Designed to handle air pressure from 0 to 250 pounds per square inch on pneumatic clutches up to 1500 horsepower, the Deublin valve introduces innovations in design and performance. Features include light weight and compactness, built-in orifice and double-piston design.

The distinctive construction of the unit eliminates the need for a spring. By preventing chatter, the valve reduces downtime and assures uninterrupted operation. Write Deublin for full details.
Inform-A-Gram No. A20.

A New Bench-Type Mill, adaptable to a wide range of light milling operation, is announced by Viking Industries, 220 Montague St., Rockford, Ill. The economical model is especially designed to do precision work and cut production costs on jobs often



assigned to larger mills. The new unit can be used for making key ways, slotting, splitting, squaring at different angles, milling flat spots on small shafts, spline cutting, small screw slotting and other similar operations. Interchangeable pulleys make possible a wide range of speeds up to 7,000 rpm. The complete unit is light and easily portable.
Circle Inform-A-Gram No. A21.

4 jobs better with 1 basic tool!

FORD "Quad"

HSS chatterless countersink

Ford's exclusive job-engineered flute design, precise concentricity, greater rigidity, lower cost add up to faster production, better production, more profitable production. No secondary burs. Ideal for heavy duty applications. Write for details.

FORD "standard"

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CARBIDE cutters, end mills, grinding burs

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FORD regrinding service adds tool life, reduces tool costs!

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Pioneers in rotary tools for more than 30 years

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HARD...
tough . . .
concentric . . .

Precision-made of both Carbon Vanadium and high carbon, high chrome steels. Available in a wide range of stock sizes from 1/32" to 1" point diameters in increments of 1/64" for immediate delivery. Decimal sizes to order for delivery within 48 hrs.

Button Dies
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Hole tapered to eliminate slug jamming. Sizes in stock to match punch sizes.

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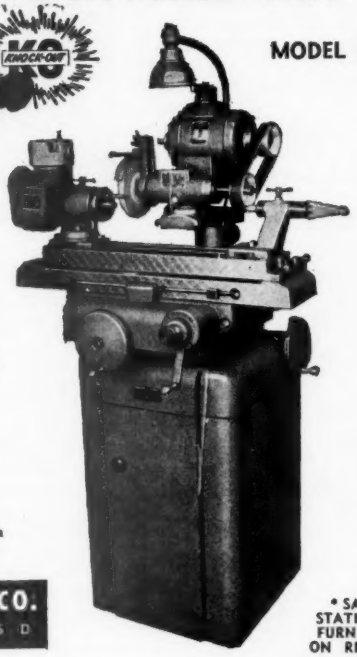
of all popularly-priced Tool and Cutter Grinders sold in 1952 were "Knock-Outs"

MODEL B860



Will do anything that machines costing 2 or 3 times more will do . . . yes and in less time.

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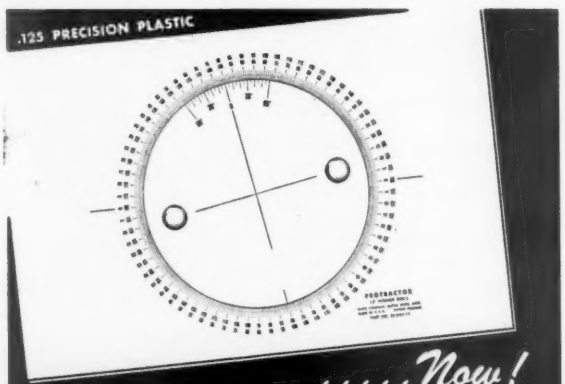

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ACCURATELY TO 5' OF ARC WITH NEW

Optical Comparator Protractor

For any projector or comparator not equipped with screen rotation. No special staging or fixtures required . . . . sturdy, accurate and moderate in cost.

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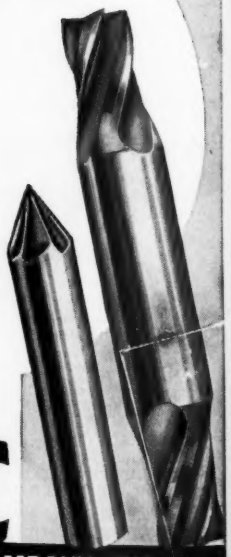
END MILLS AND CENTERLAPS

Raymac Solid Carbide end mills and centerlaps assure you precision workmanship, long tool life and minimum down time, plus the advantages of a specific tool for individual applications.

Write today for complete technical information.



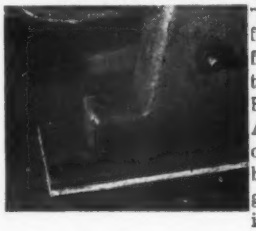
RAYMAC MANUFACTURING COMPANY INC.

3729 CASS AVENUE, DETROIT 1, MICH.

Inserted Blade Shell End Mills for steel, cast iron and non-ferrous metals are now included in the line of carbide cutting tools manufactured by the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich. Blades are quick-replaceable, of serrated-back design with carbide tips and are secured with minimum stress by wedges which distribute holding pressure along the entire length of the blade.

The cutters for steel are available in 4″, 5″, 6″ and 8″ diameters while the cutters for cast iron can be had in sizes from 3″ to 8″ inclusive. Replaceable blades are stock in carbide grades also. **Inform-A-Gram No. A22.**

Vibraglass Is Now Finding man non-military uses such as vibration-absorbing mounts for presses and machine tools, lightweight shock-absorbing mounts for aircraft instruments and radio equipment and vibration-mufflings strips in forced air furnaces. Developed for the U. S. Navy, the material is produced by Glass Fibers, Inc., 1810 Madison Ave., Toledo, Ohio. It is made of glass fibers compressed and bonded to support loads as great as 2,000 pounds per sq. in. **Inform-A-Gram No. A23.**



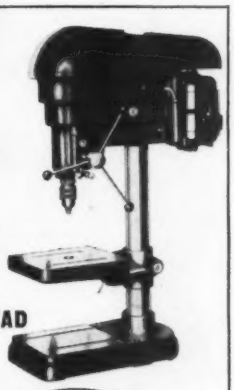
A New Improved No. 2 Vertical Milling Machine is being produced by the Jackson Machine and Tool Co., P. O. Box 193, Jackson, Mich. The new unit is characterized by a heavy 4¼″ diameter quill construction. Table size is 9″ by 36″ on the standard machine which is also equipped with coolant pump system. The unit has a vertical spindle travel of 4″, table cross travel of 10″ and longitudinal table travel of 21 inches. **Circle No. A24.**

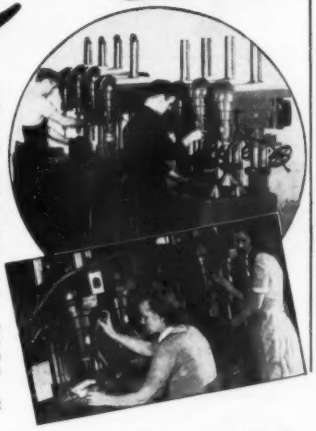
A New Low-Cost Duplicating Attachment for Engine Lathes is now being manufactured by the Air Control Division of Lehigh Foundries, Inc., 1500 Lehigh Dr., Easton, Pa. The pro-tracer is a simple, compact unit that is reportedly virtually foolproof and break-down free. It can be used for runs too short to warrant the set-up time necessary when using "long run" equipment. The product is heavy duty constructed, enabling small shops to produce sizeable quantities of turnings that otherwise may have been impossible because of limited facilities. **Circle Inform-A-Gram No. A25.**

The ONLY 15″ DRILL PRESSES WITH 5/8″ CAPACITY

BOICE-CRANE

LOW PRICED HEAVY DUTY HELMET HEAD SERIES 2600





50% thicker column (3/16″ walls). Guaranteed greater rigidity and closer tolerances for precision at the chuck, where it counts.

Up to 50% more bearing against side thrust on the longer, and 20% larger, quill (2 1/16″ dia.) when deep hole drilling and routing. 4″ or more of the quill is always supported. An inexpensive attachment permits fine hollow chisel morticing.

Rugged steel (not die cast) 6-tooth (involute shaped) splined drive sleeve. Far more sensitive powerful quill feed.

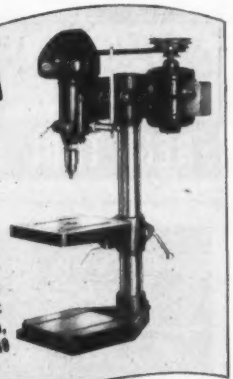
Quick-acting hinged belt guard.

50 High and Slow Speed Bench and Floor Models 1-2-3-4 Spindles

5 speeds—25% greater range. Easy speed changing. Various options on work tables. Heads and parts sold separately for special setups.

Full line of tapping heads, foot feeds and accessories.

CHALLENGER SERIES DRILL PRESSES



● Exclusive two-way drive aligner-belt tensioner. Perfect alignment and tension instantly released for speed changing without wrenches or tools. 6-tooth splined drive. Every splined-drive part made of steel for quiet running and longer life. Four heavy grease-sealed ball bearings. Massive head and positive, easy, quick acting non-mar quill and column locks. Popular priced. 5 speeds in two ranges: 500, 925, 1750, 3250 and 5500 in the high, and 425, 775, 1330, 2200 and 3340 in the low.

AVAILABLE NOW through industrial supply distributors in most cities. No long waits for delivery. High quality, low cost tools for cutting, shaping, drilling and finishing wood, fibre, metals and plastics.

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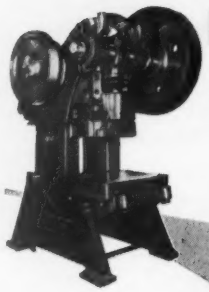
15 MODELS

16 to 90 ton capacity

RUGGED DEPENDABLE TIME-TESTED



new...different...better

HYDRA-SHEAR

3 models 6, 8, 10 feet to shear 10 gauge

No gears or clutch . . . curl and burring held to a minimum.

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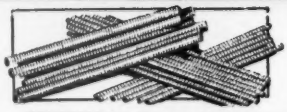
REID QUALITY TOOL-ROOM ACCESSORIES AT MODERATE PRICES!



COMPRESSION SPRING ASSORTMENT

Music wire. Many sizes and diameters. 10" lengths. Select size. Cut to length desired. Low prices.

TRIGGER STOPS

For progressive dies. Made of solid finished steel—soft. Black penetrate finish. Finger end forged flat. 4 lengths—3½" to 5"—3/16" dia.

THREADED PLASTIC BALLS

Black. For machine tools, fixtures, etc. Reduces installation costs. Wide range of sizes.

HAND WHEELS

Straight and Dished

Best quality. Both spoke and solid web types. High luster rims. With or without solid or revolving handles.

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All steel with plastic hand balls in single or double offset and straight types. Many sizes. Strong. Attractive.

CAST IRON HAND KNOBS

3 Styles

Scalloped, long shank and prong type. Many sizes. Fine grain cast iron. Smooth finish.

ALSO

Machine handles, levers, cranks, fixture units, magnetic parallels, etc.

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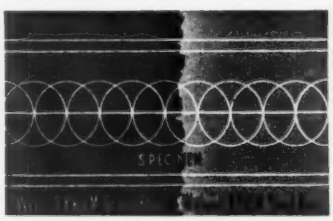

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Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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THE DYKEM COMPANY

2303L NORTH 11TH ST. ST. LOUIS, MO.

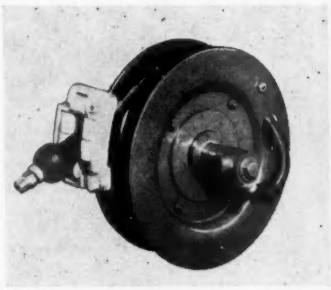
Specify DESTACO **Arbor Spacers and Shims**

For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters ¾ to 4 . . . 19 graduated thicknesses .001 to .125, specials over .125. Spacers with keyways, shims without. Stocked by Industrial Distributors.

DESTACO **DETROIT STAMPING COMPANY**

MIDLAND AVENUE • DETROIT 3, MICHIGAN

The William Turk Co., 11070 S. Alameda St. Lynwood, Calif., has recently placed on the market an addition to its line of hose reels.



It is a new type reel designed especially for use on benches and machine tools; in factories, garages—anywhere that 12 feet of hose will do. **Circle Inform-A-Gram No. A26.**

THIS HANDY NEW CLAMP-ALL is a simple but ingenious device for quickly and securely clamping large and small work on machine tools having T-slot beds. Produced by Clamp-All Co., 895 Montford Rd., Cleveland 21, Ohio, it comes with clamping ranges of ½" to 11" and ¼" to 9" from the bed. Circle Inform-A-Gram No. A27.

Complete Diamond Lapping Compound and equipment are now supplied in handy kits by Penn Scientific Products Co., 5941 Alma St., Philadelphia 24, Pa. The master kit consists of nine Spectrum grits,

sizes 120, 170, 325, 600, 1200, 2000, 3000, 8000 and 14,000 in strict accordance with U. S. Bureau of Standards specifications. In addition, the kit includes a 4-oz. bottle of diamond lapping oil, an atomizer oil applicator, an assortment of Spectrum micro laps, orangewood sticks and an assortment of felted mounted points. **Circle No. A28.**

world's largest one-piece surface plate

Ivan Rahn, Factory Superintendent, is shown checking the surface with an auto-collimator.

...MADE OF GRANITE

Weighs 60,000 pounds, measures 20 feet long, 6 feet wide and 3 feet thick. 300 average size surface plates could be made from it.

The overall accuracy of the entire surface is .0015", every 6 foot square section is .0002" and every 2 foot square section is accurate to .00005". This is as close to a theoretically perfect plane, over such a large surface, as man has yet attained.

Making the huge surface plate required new engineering developments and special equipment unique to the industry.

We are honored to have been selected to produce the world's largest and finest surface plate. It is a tribute to the "know-how" and skill of our craftsmen, acquired through ten years of granite plate research and production.

A recent accomplishment of

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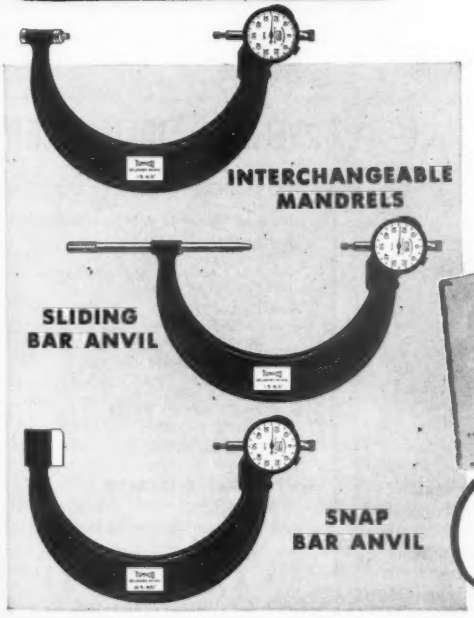
LIGHT • STRONG • FAST • ACCURATE



● Tubular frame construction assures light weight with maximum strength and rigidity plus advantage of minimum thermal expansion or contraction.

Tubular Indicator Gages are easier to use, speed production, reduce fatigue and encourage accuracy. Dial indicators give instant visual readings in English or Metric.

Indicators are attached to adjustable offset mount, not to stem, to avoid damage through rough usage. Gages furnished with interchangeable mandrels, sliding bar mandrels or snap gage block as desired. Standard sizes, 4½" to 54". Special larger sizes available.

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Send me latest information on precision gages, micrometers, dial indicators, calipers, rules, Verniers, etc. New ideas. New methods. Time savers.

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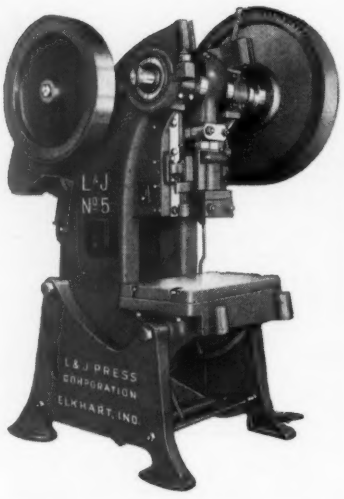

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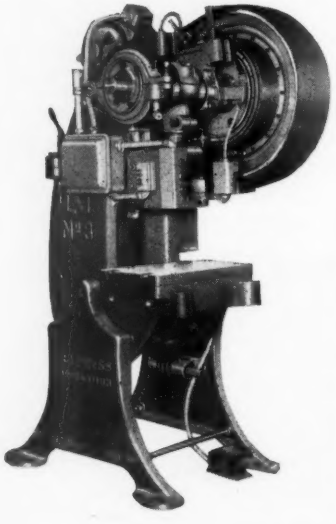
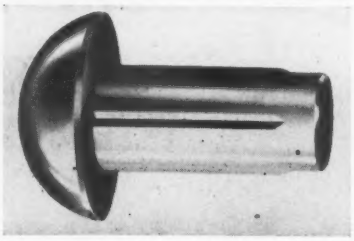
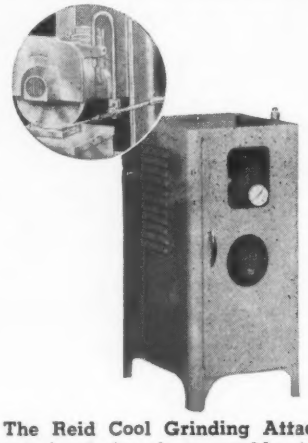
Available with air clutches.



The Driv-Lok Stud, designed to speed the attachment of light metal or plastic parts such as name plates,

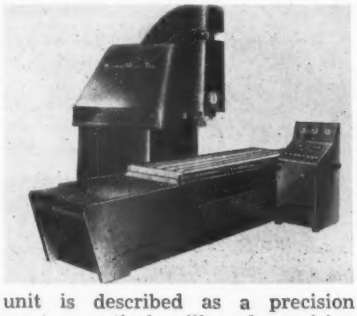


covers, brackets, etc. to heavier structural members, has recently been introduced by the Driv-Lok Pin Co., 715 Chauncey St., Sycamore, Ill. **Inform-A-Gram No. A29.**



The Reid Cool Grinding Attachment is designed to enable tool room grinder operators to adapt their machines for wet grinding without the use of splash guards around the work. Wet grinding with this atomized, rapid-evaporating, rust-resistant, spray permits operation with the work clearly visible. Manufactured by Reid Brothers Co., Inc., Beverly, Mass. **Circle Inform-A-Gram No. A30.**

Hydro Micro-Tel Vertical Tracing, profiling and milling machine has been introduced by the DeWitt Lewis Co., of Wayne, Mich. The



unit is described as a precision master vertical mill and precision tracer-profiler. The product is capable of hydraulic tracing accurate to .001 inch and electronic tracing or profiling accurate to .0002 inch. **Inform-A-Gram No. A31.**

Metal Cutting Saws ...by Reltool

Precision Made: Reltool Circular Saws of various types are made by modern precision methods of fine, high-speed tool steels. Hollow ground to required tolerances, they are slightly concave for ample clearance to assure free running in deep cuts.

A Reltool Saw for Every Need: In addition to Plain Metal Slitting Saws, Reltool makes Metal Slitting Saws with Staggered Teeth and Side Clip Clearance, Screw Slotting Saws, Formed Tooth Saws, Fine and Coarse Tooth Tenacious Saws, Plastic Saws, and Circular Shears.

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RELIABLE METAL CUTTING TOOLS

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  Also larger sizes.
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  .0001" reading—0.1".
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- **VERNIER HEIGHT GAGES**
  Sizes 10", 12", 18", 20", 24", 30", 40", 60", 80".
- **VERNIER DEPTH GAGES**
  6" and 12" sizes
- **DIAL INDICATORS**
  Various sizes
- **INTERNAL BORE GAGES**
  For Bores from ¼" to 15".

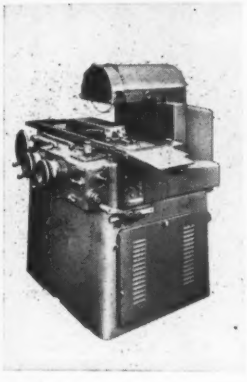
All instruments absolutely guaranteed.

For Descriptive Literature Write To:

KARL A. NEISE

381 4th Ave., Dept. TP, New York 16, N. Y.

The New Electric Vapor Degreaser is a production unit portable, and thermostatically controlled, having a heat-up time of less than 20 minutes. When used with the maker's solvent, rust and corrosion problems are practically eliminated. Features include quick and easy attachment of flusher pump, lip-vent and other accessories. J. D. Wallace & Co., 164 S. California Ave., Dept T. Chicago 12, Illinois.
Inform-A-Gram No. A32.

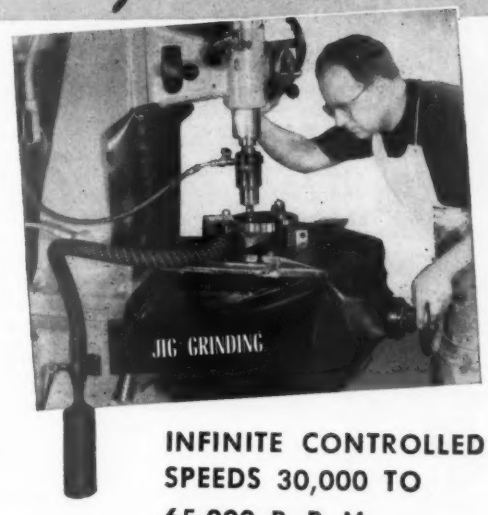


This Toolroom Surface Grinder is representative of a line of English machines now available here through Kelvin Systems Corp., 135 Front St., New York 5, N. Y. It is noted for ease of control, and is capable of meeting the most stringent requirments of the toolroom from the standpoint of accuracy. Massive construction makes it just as adaptable to continuous heavy-duty production work.
Inform-A-Gram No. A33.

Portable Granite Surface Plate. Designed particularly for the convenience of inspectors in toolrooms and close tolerance production plants, these new portable plates were recently announced by the Elkro Co., 734 Albany St., Dayton, Ohio, and are described in file folder #T-3. These surface plates will retain their surface accuracy of .00005″ or better over a

period of years. Among the advantages claimed by the manufacturer are: extreme accuracy, non-magnetizing, non-rusting, non-warping, shock proof, nonabrasive, greater than tool steel hardness, portability for convenience and multiple uses, and the enduring flatness and hardness of carefully selected granite. The granite from which these highly accurate plates are manufactured was chosen after a complete and comprehensive study of all the types available, and possesses the superior qualities of minimum porosity, a dense, tightly fuzed crystalline structure consisting of a hard wearing material for life and a soft one to prevent wringing of tools. **Inform-A-Gram No. A34.**

JIG GRINDING ACCURACY *guaranteed**



INFINITE CONTROLLED SPEEDS 30,000 TO 65,000 R. P. M.

Easily connect jig grinder to jig borer or mill

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3⅜″ long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs.

*Dependably accurate to "tenths"

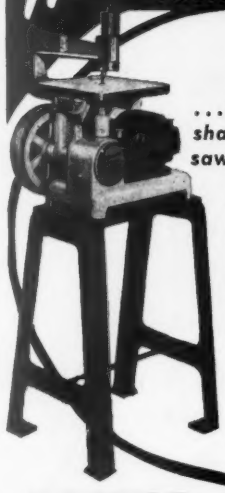
Vulcanaire
It's built by toolmakers for toolmakers

Vulcan Tool Co. • Pritz Street • Dayton 10, Ohio

CUT TOOL AND DIE-MAKING COSTS WITH . . .

Milwaukee

DIE FILERS
PROFILE GRINDERS



DIE FILERS

. . . for straight-line sharp corner filing, sawing and lapping

This low cost precision-built unit performs all die making operations at savings up to 40%. Furnished complete with motor and two overarms. No extras to buy.

Write for illustrated Bulletins and Prices.

PROFILE GRINDERS

. . . for high speed Precision Grinding of curved and Irregular Contours

Standard features include 20,000 or 30,000 R. P. M. spindle speeds, ½ H. P. motor, Collet Chuck, Compound tilting table, built-in wheel dresser. Write for illustrated Bulletins and Prices.

RICE PUMP & MACHINE COMPANY

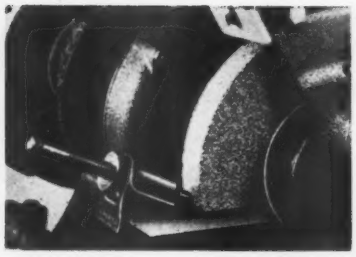
228 N. 12th Ave. • Grafton, Wisconsin

T-slot Bolts

The world's best . . . one-piece, drop-forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: ½ — $1.36; ⅝ — $1.36; ¾ — $1.58; ⅞ — $1.89. Write for price list.

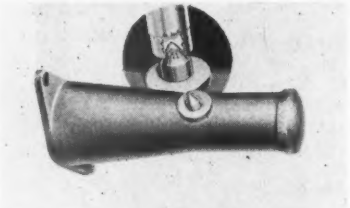
THE O K TOOL COMPANY, Milford 8, New Hampshire

★ *Back Your Future* ★
U. S.
★ SAVINGS BONDS ★



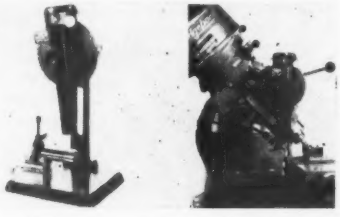
Simple Construction, Efficiency, Versatility and Low Cost are the outstanding features of this new "Dymondcut" wheel dresser by Hazerodt Associates, 416 Ford Bldg., Detroit 26. Will dress wheels to 10" dia., can be used also for either angle or side dressing. All data from maker.
Circle Inform-A-Gram No. A35.

New Center Lubrication Method for lathes and grinders is offered by this "Center Lube Dispenser"



— H. K. Tool Co., Waukesha, Wis. It mounts either on machine or bench and releases lubricant in a single quick movement as operator places added pressure on the work or mandrel whilst holding work with both hands. In one bump!
Circle Inform-A-Gram No. A36.

"G-12 Goniometer Collimator" is a new precision tool that when attached to machine tools or used for inspection purposes measures angles to great precision and yet is simple enough for ordinary shop operations. Collet and lathe tool angles,



for instance, can be easily checked, and bedway flatness can be measured to within .00007". Making all types of angular measurements rapidly and accurately, the device combines rugged design with proven optical theory, speed of measurement and simplicity of setup. It eliminates the use of time-consuming sine-bar techniques and can be used with similar efficiency by semi-skilled or experienced workers. Safe Flight Instrument Corp., White Plains, New York.
Circle Inform-A-Gram No. A37.

Over 85% of the torque wrenches used in industry are

STURTEVANT TORQUE WRENCHES

Read by Sight, Sound or Feel.

- Permanently Accurate
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in inch ounces . . . inch pounds . . . foot pounds (All Sizes from 0-6000 ft. lbs.)

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THE SHORE INSTRUMENT & MFG. CO., INC

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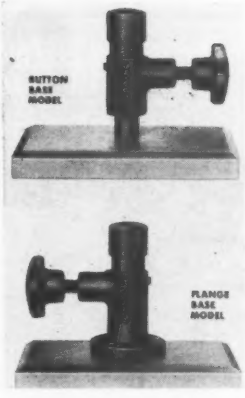
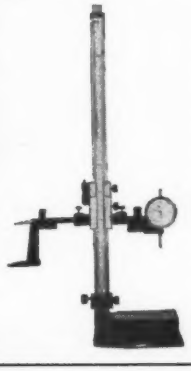
Jamaica 35, N. Y.

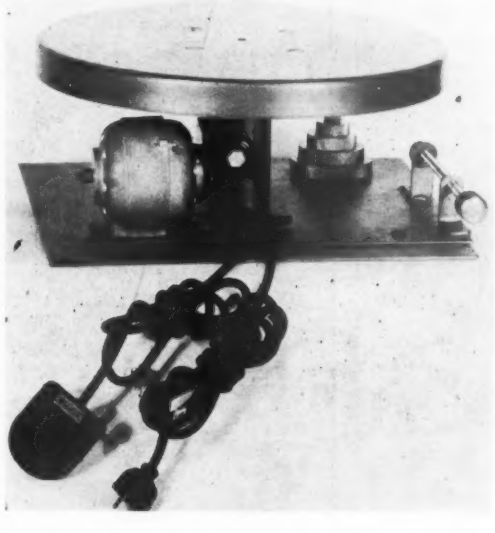
This New Standard Model Spring-Jack for all purpose use in metalworking plants is made by Lodding Inc., Dept N. 82, 79 Beacon St., Worcester 1, Mass. It is a versatile work support for machining, and makes unnecessary special jacks for different jobs. Operation of the new jack is extremely simple, and its design has many features for long trouble-free life. Button and flange base models available.
Inform-A-Gram No. A38.





The Mora Vernier Height Gage Illustrated has recently become available in this country through Karl A. Neise, 381 Fourth Ave., New York 16, N. Y. It is designed for absolute and differential layout and measurement. Scribers and offset scribers as well as dial indicator with holder may be furnished as standard attachments. Literature available.
Inform-A-Gram No. A39.

This Electrically Turned Work Positioner has variable speeds and is the smallest and lightest available. It is offered in both bench and pedestal models and



with accessories to make it inclinable and operable intermittently. Without the pedestal the complete unit weighs 31 lbs., is 5½″ high and covers an area 20″ x 18″. It will safely carry a work load of 300 lbs., and move it continuously or intermittently at speeds adjustable upward from ¼ rpm. Complete data is available from the maker—All-State Welding Alloys Co., Inc., 249 Ferris Ave., White Plains, N. Y.
Circle Inform-A-Gram No. A40.

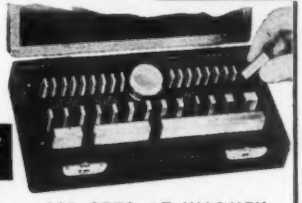
ULTRA-CHEX GAGE BLOCKS *for Every Need!*

Supplied in one Superior Accuracy
5 MILLIONTHS ± ACCURACY

9 Block Set
$22.50
OPTICAL PARALLEL $5.00

Quick Delivery on Small Standard Sets

34 Block Set
$125.00
INCLUDING OPTICAL PARALLEL



82 BLOCK SET also available
$275.00 Complete

This Set will supply the needs of any discriminating shop that must work to gage-block precision.

ALL SETS AT "MONEY SAVING PRICES" DUE TO MASS PRODUCTION METHODS.

Dealers: Here's a real profitable line!

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GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION INSTRUMENTS
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DRILL HOLES AS SMALL AS .030″ IN ANY METAL OF ANY HARDNESS OR THICKNESS!

The M-300 Elox Electron Drill* combines the best in the 'arc machining' process. In addition to drilling holes as small as .030″ it is adjustable for machine finishes ranging from *coarse, fine, extra fine and super fine* ...on any metals from magnesium to cemented carbide. The M-300 with exclusive Elox Automatic Feed allows for continuous operation with much of the human element removed. Using electrodes costing less than 3¢ per inch, with 'super fine' cutting, 1″ of electrode will cut as much as 33″ of hardened steel! Here indeed, is a dual-purpose machine that is being used for production machining of hardened steels and for removing broken drills in salvage. Write today for details and list of users.

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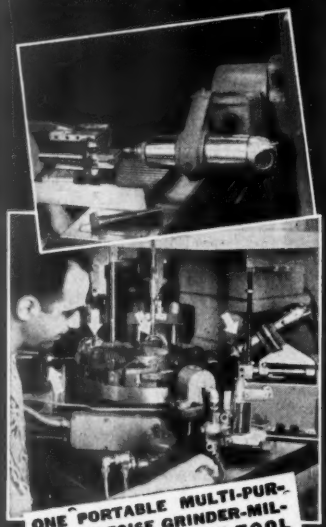
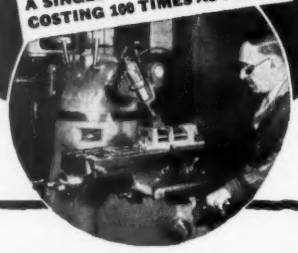
LOWEST COST PRECISION

FOR TOOL ROOM AND PRODUCTION



ONE PORTABLE MULTI-PURPOSE PRECISE GRINDER-MILLER WITH MACHINE TOOL MOUNT DOES THE WORK OF A SINGLE-PURPOSE MACHINE COSTING 100 TIMES AS MUCH!



Little can be done today to reduce labor and material costs. For substantial savings employ new, better techniques. Mount PRECISE Grinder-Millers on lathes, drill presses, milling machines and other machine tools or use in special production set-ups. ¼ HP; speeds from 20,000 to 45,000 r.p.m.; 115 volts, AC-DC. Ruggedly built for continuous duty. All metal housing; rigid PRECISE quill; sealed micro-precision bearings. *High speeds and accurate PRECISE quill and chuck are ideal for tungsten carbide cutters.* PRECISE will grind, mill or finish any material from soft wood to the hardest alloy steel.

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PRECISE PRODUCTS CORPORATION
1341 CLARK ST. • RACINE, WIS.

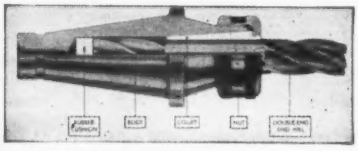
Precise

GRINDER-MILLERS

Speedy Internal Wrenching is possible with this new ratcheting tool by the Tubing Appliance Co., 10321 Anza Ave., Los Angeles 45,

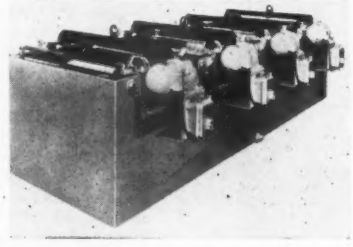
Calif. The open end ratcheting design plus thin walled sockets make it possible to do the work of an open-end wrench, adjustable wrench, box, socket, and ratchet wrench. It provides the only known means of ratcheting turnbuckles. Torque handles may be used.
Circle Inform-A-Gram No. A41.

This New Swedish Made Collet Chuck is now available from Victor Machinery Exchange, Inc., 251



Centre St., New York 13, N.Y., is noted for simplicity and high accuracy. It is made with Morse, Brown & Sharpe, milling machine taper or with straight shank. Overhang is small and maximum run-out is .0004". 48 models, capacity from ⅛" to 2".
Circle Inform-A-Gram No. A42.

This Completely Submerged Plating Barrel was recently announced by the Hanson-Van Winkle-Munning Co., Matawan, N.J. All surfaces of the work receive a uniform solution bath because none of it can be exposed to the air while



tumbling. This results in a consistent, all-over even finish. The completely submerged barrel also permits greater current density and thus makes possible faster plating. The new equipment includes both barrel and plating tank. The barrel is hexagonal in shape and has an inside diameter of 14". Barrels are available in 30" and 36" lengths, having approximate capacities of 125 and 150 pounds respectively.
Circle Inform-A-Gram No. A43.

THOSE WHO KNOW BUY Gelber COOLANT PUMPS

1 drop to 450 G.P.H. of Water Soluble Coolant

BANTAM MODEL 5GC
All Bronze, Centrifugal "Friction" Free Pump. 1/30 H.P. Single Phase, Continuous Duty Motor. 5 Gal. Tank, 6 ft. Koroseal Tubing, Flow Control, Switch, Conduit Box, Plug and Cord, Removable Strainer. Shipping. wt., 18 lbs.

F.O.B. **$49.50**
Immediate Delivery

MODEL 2-5CS
All Hycar Pump with Stainless Steel Shaft . . . Not affected by Coolants or Abrasives—New Patented Principle requires Less Power when Pumping Less Fluid. 1/35 H.P. Single Phase, Fan Cooled Motor, Sealed Bearings. 5 Gal. Welded Steel Tank, (Baked Enamel). Removable Inner Container, 6 ft. Flexible Steel Tubing, Flow Control Valve, Cord and Plug. Shpg. wt., 30 lbs. Height only 9½".

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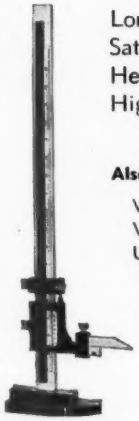
NEW SATIN CHROME
precision
HEIGHT GAGES
12" to 36"



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Heavy Construction
Highest Precision

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Hand Scraped Surface Plates
Bench Centers

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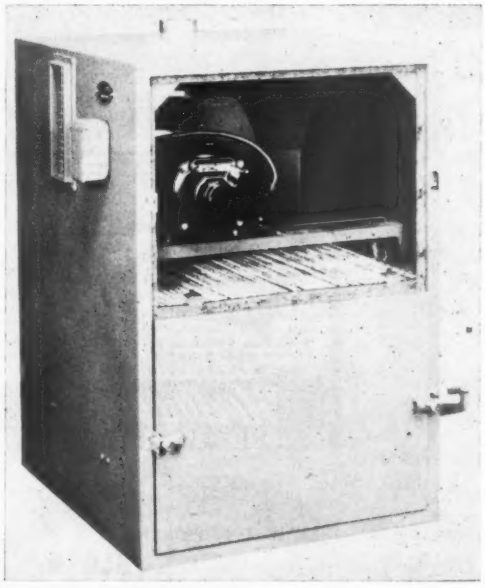
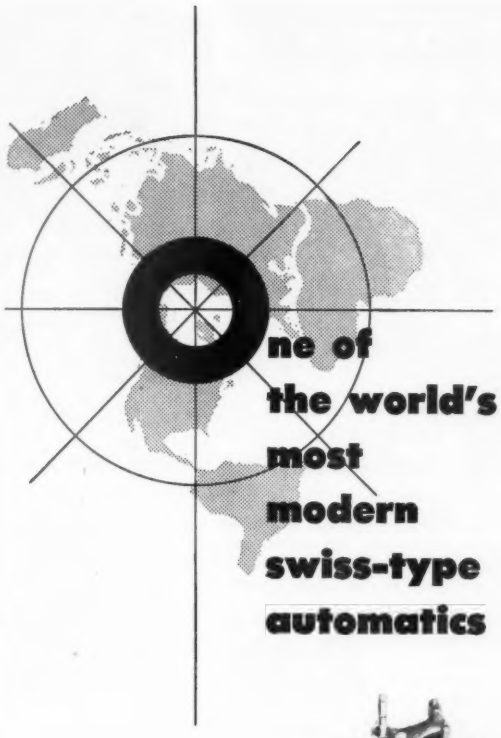
Brand Tool Co.
907 South Victory Blvd.,
Burbank, California

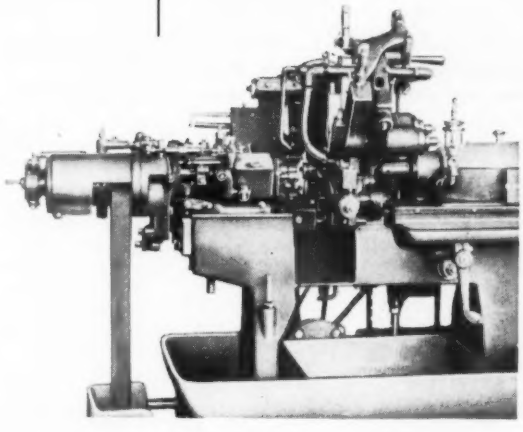
In A Large Farm Equipment Plant, a wide range of steel rod pointing work is currently being handled 40% faster than by previous methods on a new bench type-end finishing machine. The unit, built by

Pines Engineering Co., Inc., 601 Walnut St., Aurora, Ill., is equipped with a foot-controlled air cylinder. The operator depresses an electrical control which starts an automatic clamp and feed cycle. The work is fed to rotating cutters which are held in the main spindle behind the chuck jaws. When the pointing operation is completed, the chuck automatically returns the workpiece and unclamps it.
Circle Inform-A-Gram No. A44.



OPTIONAL CONSTRUCTION on several of the smaller type Torit Dust Collectors is the placing of the exhaust outlet in the left side panel as shown above. Its purpose is to provide efficient recirculation of the clean air when the most practical location for the dust collector is beneath a bench or work table. Complete details available from Torit Manufacturing Co., 271 Walnut St., St. Paul 2, Minnesota.
Circle Inform-A-Gram No. A45.





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advanced engineering design for today's
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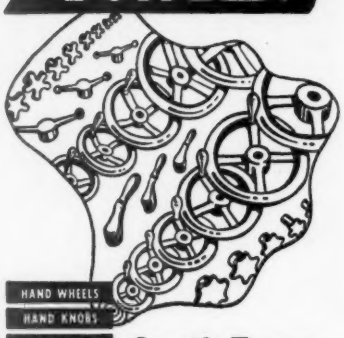

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A complete line of high grade hand knobs, handles, and hand wheels is available from Tomco. Immediate shipments are made from stock of standard items. Specialty items are made to your specifications.

For original equipment or replacement parts look to Tomco for quality and service.

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Blank or Machined - from stock

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Used with any standard flexible shaft machine—speeds up to 12M RPM.

The Di-Profiler is a new multiple action tool that
(1) Reciprocates
(2) Oscillates and
(3) Rotates when used with the spindle attachment. Stroke is adjustable from 0" to ¼".

It files, hones, polishes, laps, chafes and saws materials ranging from carbide tools to soft materials. The only machine of its kind.

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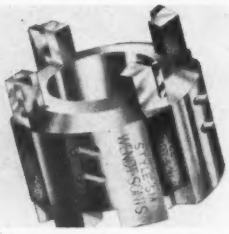
CAMS

Made to Your Specifications

Let Us Handle Your Cam Problems

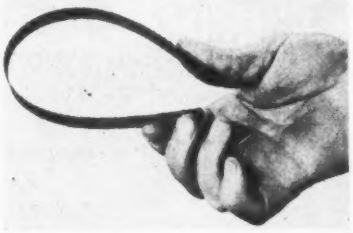
BLOOMFIELD TOOL CORPORATION
30 Farrand St. Bloomfield, N. J.

It Takes a Delicate Micrometer to measure the close tolerances of this micro-file by Tacony File & Hardware Co., 2814 N. 4th St., Phila. 32, Pa. The company makes them in sized kits for such delicate work as precision die finishing or gap filing of electrical contacts or spark plugs. The thinnest is .009" thick; tolerance .0004". **Circle Inform-A-Gram No. A46.**



Smoother Finishes and More Precise Tolerances are possible with the new standard inserted blade shell mills, by Wendt-Sonis Co., Hannibal, Mo. Blade slots are finish ground to quicken setup, and blades are also ground on both locating sides. All carbide cutting edges diamond lapped. 3" to 6" sizes, variety of styles.
Circle Inform-A-Gram No. A47.

New All-Purpose Hand Blade. The addition of a new Rocket high-speed hand blade to the Barnes line was recently announced by the sales manager, Mr. V. H. Olsen. The new blade is a flexible,



safe all-purpose blade, which, due to Barnes gradient hardness, combines cutting ability, flexibility and safety in perfect balance all in one blade. Only the teeth are hardened. The back is semi-hardened to retain flexibility. Extensive tests under actual working conditions indicate that it is the ideal all-purpose blade for cutting a wide variety of metals and shapes. Dept B—W. O. Barnes Co. Inc., 1297 Terminal Ave., Detroit 14.
Circle Inform-A-Gram No. A48.

Precision Feeds For All Presses

- Easily installed on any press
- Can't slip. Reverse instantly
- Feed in thousandths
- Maintain original setting. No ratchets or pawls to wear down and affect feed spacing.

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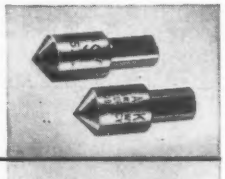

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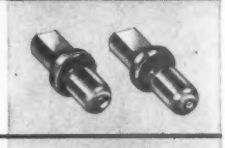

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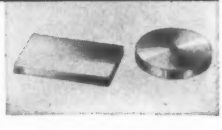

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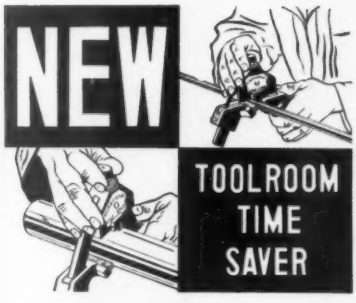

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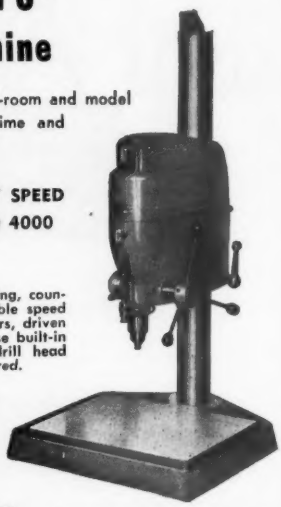

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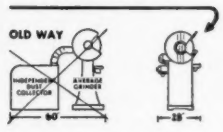

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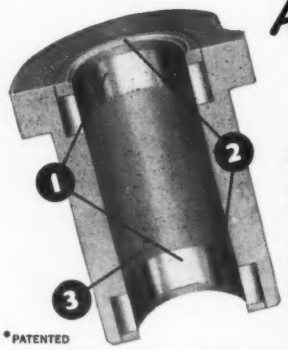

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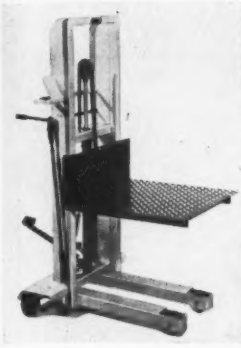
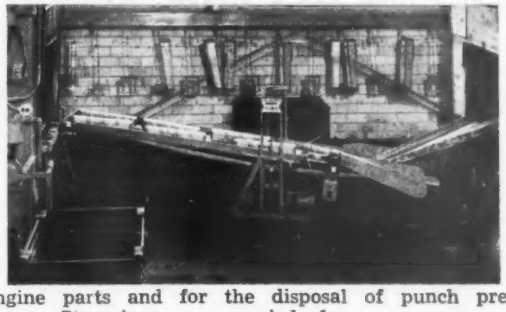
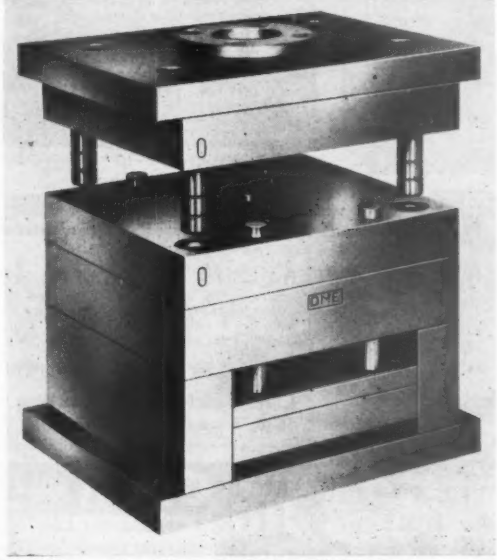


New Hydraulic Lift Models are now being introduced by Big Joe Manufacturing Co., 900 West Jackson Blvd., Chicago 7, Ill. Among the many functional improvements that are reported to increase the ease of handling bulkier loads with even greater safety are a straddle type base that can be furnished in a range of widths up to 50"; adjustable forks; swivel casters placed at rear and roller bearing wheels in front for maneuverability; dual ground gripping brakes. **Inform-A-Gram No. A49.**

Portable Adjustable Conveyors, manufactured by May-Fran Engineering, Inc., 1726 Clarkstone Rd., Cleveland 12, Ohio, are being used in the new Ford Motor Company Cleveland engine plant. The units are employed for the handling of small mass-produced



engine parts and for the disposal of punch press scrap. Stampings are carried from one press to another through a series of operations by large size conveyors, while small size units are being utilized to transport press scrap up an incline for discharge in tote boxes. **Circle Inform-A-Gram No. A50.**



The New 9" x 8" A-R Series Mold Base manufactured by Detroit Mold Engineering Co., 6686 E. McNichols Rd., Detroit 12, Mich., has been especially designed for use in smaller plastic injection molding presses. It offers more useable cavity area than any standard mold base of equal size (a total of over 48 sq. inches) according to the producers. **Circle Inform-A-Gram No. A51.**

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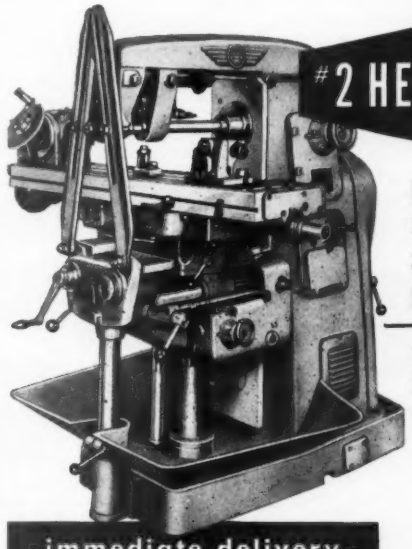

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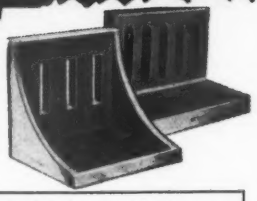

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#202	5.50	6"	5"	4½"	#302	7.75
#203	7.00	7"	5½"	4½"	#303	9.25
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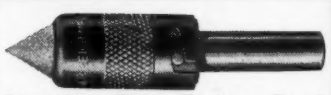

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. . . End Finishing, from page 154

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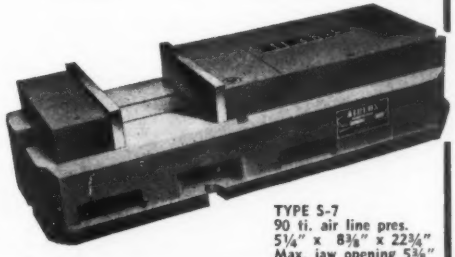

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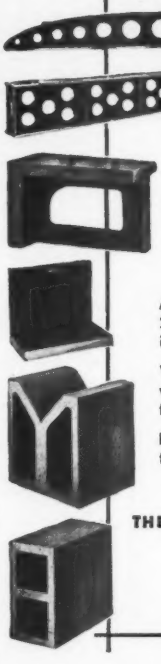

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DRILL JIG BUSHINGS

. . . Screw Steel, from page 134

Operation: Production of **turnbuckle screw** on a six-spindle 1" Acme Gridley Automatic, with turn, form, thread, cut-off, chamfer, and relief cut. Speed (using B-1113): 228 sfpm at .003" feed, with production of 400pcs/hr. Results: Use of J&L 1213 made it possible to increase speed to 360 sfpm, with production doubled at 800 pcs/hr.

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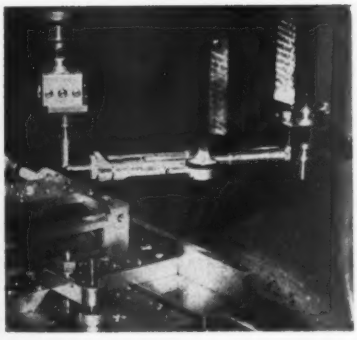

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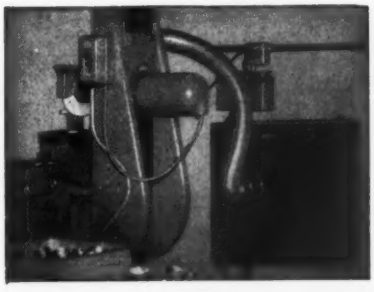

Please mention, "I saw it in TOOLING and PRODUCTION"

. . . Second Operations, from page 43

drilled and reamed through the stripper, stripper plate and die shoe. This reaming operation is very important for a subsequent operation.

Next, stripper plate (H) is doweled (L) to the stripper (O) without slipping the latter off the posts. Then the punch holder (A) is slipped over the guide posts (P). This entire assembled unit is clamped to the face plate of a lathe and the punch holder shank indicated for a true center.

After centering, the punch holder is slipped off and a large clearance hole is bored thru the stripper and stripper plate. In this same setup the hole is drilled, but not bored, for the pilot thru the shoe. After removing the job from the lathe, the stripper plate is removed from the stripper and doweled to the die shoe. The previous reaming guarantees perfect alignment whether doweled to the stripper or die shoe.

The four screw holes already in the stripper plate are transferred to the shoe, drilled, and tapped (J) and the plate is secured to the die shoe (G) by four cap screws. Slipping on the stripper and punch holder and mounting the unit on the table of a rotary head tool and die milling machine, the punch holder shank is indicated true to the center of the rotary head. Offsetting the rotary head the proper distance, the four piercing punch holes are drilled, bored, and counterbored to a slip fit of the punch shank diameter in the punch holder and to the tap drill size for the backing set screws, after which the punch holder is removed.

The four piercing punch holes in the stripper are then drilled, bored, and taper reamed, approximately ¼ of an inch from the trough, using precisely the same dimensional points as were used in boring the holes in the punch holder, after which the stripper is removed. Next, the stripper plate is bored to the slip fit size of the punch point, again using the same precise stopping points as previously used, after which it is removed. Then the die shoe is drilled and bored to accommodate the die buttons (N) sometimes called piercing bushings; also the slug clearance holes are drilled through.

At this time, the rotary head is brought to the center position and the pilot hole is bored to the pilot (M) shank diameter. Now the two gage pin (K) holes are bored to their proper position as figured by triangulation.

. . . Continued on page 184

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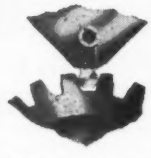

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. . . Toolplastik, from page 47

proving that Toolplastik tooling can be constructed for less than half the cost of metal tooling.

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In conclusion we would like to repeat that Rezolin Toolplastik is not the ultimate in tooling material. There are applications where it is not suited and Rezolin engineers are frank to admit this when presented with certain tooling problems. But it can readily be seen that where Toolplastik can be used its advantages are many and varied.

. . . Second Operations, from page 182

This method of boring positively insures perfect alignment throughout the die because all of the boring is done in exactly the same position on the table of the machine and all in one setup. The necessary clearances for the gage pins are drilled through the stripper plate and the stripper. The holes in the stripper plate for the punches are countersunk (to clear the radii of the punches) to such a depth as to give the punch point maximum guidance and support and yet allow the punch enough travel to perforate the metal. The stripper bolt and spring holes are drilled, the stripper plate is hardened and then the die is assembled.

Positioning the die buttons (N) above the surface of the die shoe (G) facilitates resharpening and also reduces the area on which any foreign matter could lodge under the workpiece.

This method of converting a punch holder into a stripper is successful only when a center post die set is employed.

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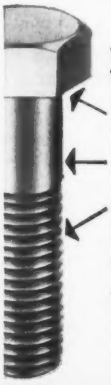

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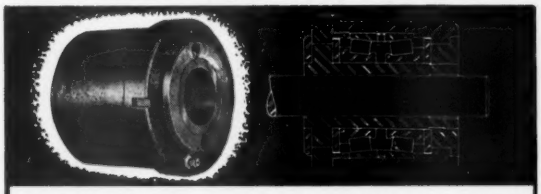

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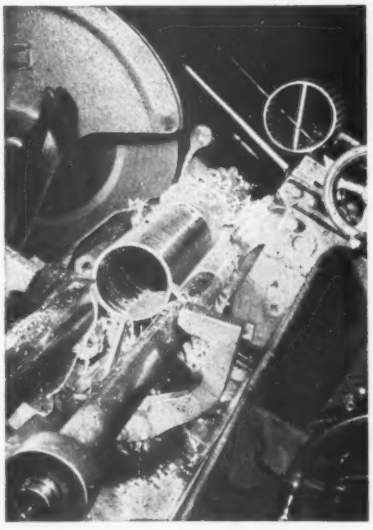

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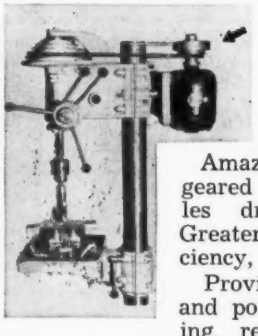

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WRITE FOR LITERATURE

. . . Multi-Slides, from page 147

generally made from high-carbon, high chromium steels. Such parts are heat-treated to a hardness of 60 to 62 Rockwell "C". Retaining blocks for die inserts and punches are usually made from an oil-hardening tool steel which is not heat-treated.

Simple forming tools are usually made in one piece and mounted on a tool-block. When wear is excessive, however, inserts are employed to minimize replacement costs. Rigid mounting of the tools is necessary to prevent their deflection under load. In some instances, it may be desirable to employ added supports to strengthen the forming tools.

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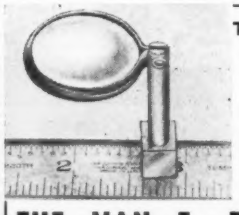

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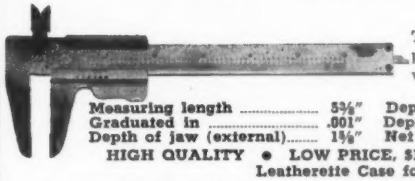

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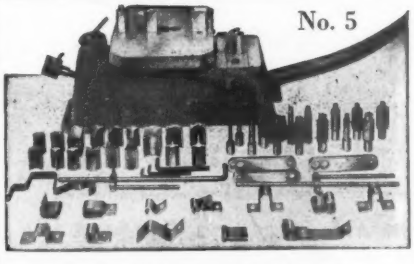

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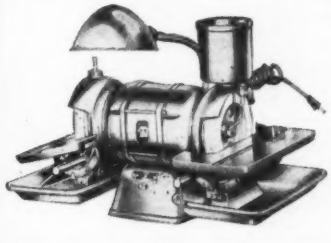

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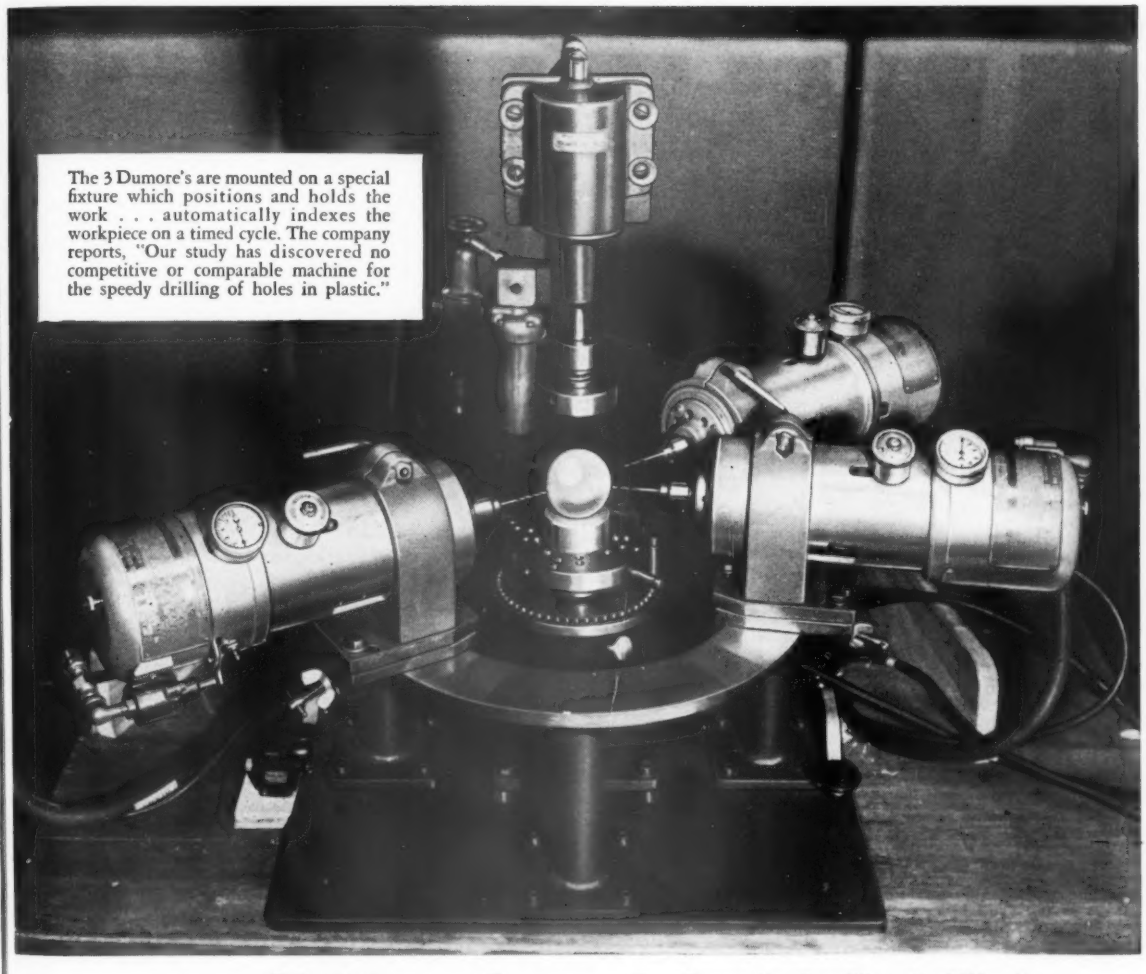
DUMORE® DRILL HEADS

increase production 322% for toy manufacturer



The 3 Dumore's are mounted on a special fixture which positions and holds the work . . . automatically indexes the workpiece on a timed cycle. The company reports, "Our study has discovered no competitive or comparable machine for the speedy drilling of holes in plastic."

. . . save $13.74 per thousand plastic balls drilled

A METHODS study revealed that three Dumore Automatic Drill Heads mounted on a special fixture cut this manufacturer's production cost from $18.00 to $4.26 per thousand balls drilled.

With annual production amounting to approximately 500,000 balls, this meant savings more than four times the original $1,600 cost of the Drill Heads and fixture. What's more, this company found that the Dumores' flexibility also helped make substantial reductions in necessary shelf inventory.

As a company spokesman put it, "Low initial cost plus flexibility and ease of operation make the DUMORE a 'natural' for multiple drilling operations."

In most cases, if you're drilling small holes in wood, plastic or metal, you, too, can cut production costs. For details, see your Industrial Distributor or write:

THE DUMORE COMPANY
1313 Seventeenth Street • Racine, Wisconsin

RELIEVES FORM TOOLS • RELIEVES CENTER DRILLS

RELIEVES TAPS • RELIEVES COUNTERBORES • RELIEVES SPHERICAL CUTTERS

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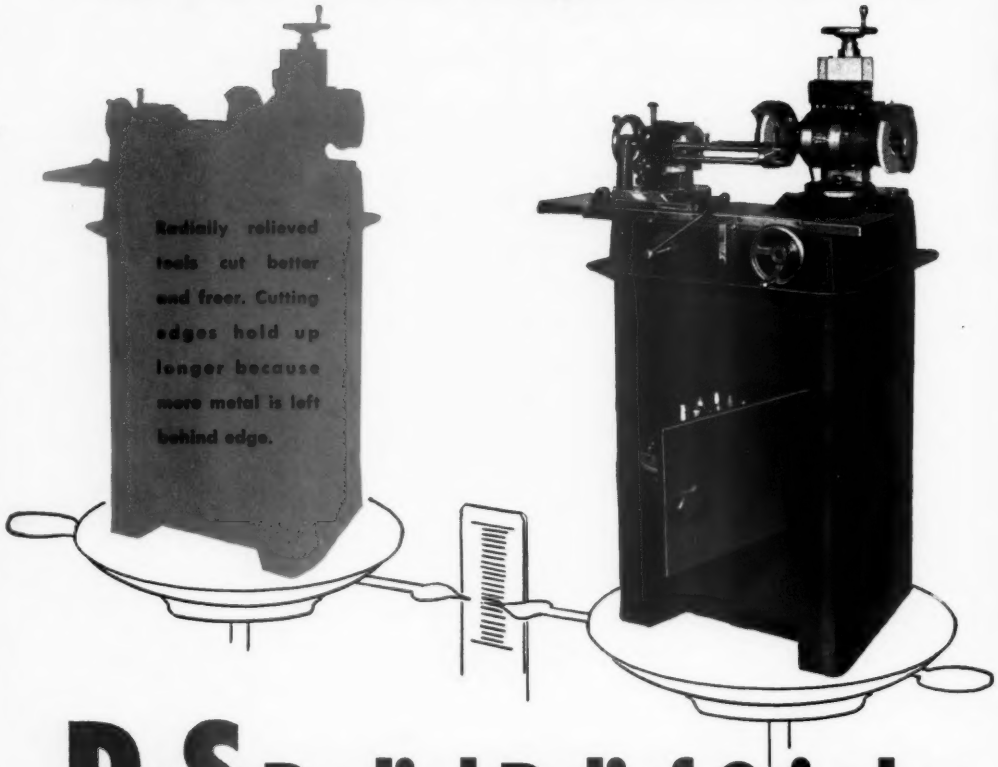
Worth its Weight in Gold!



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GIVES USERS GREATER LIFE, BETTER SERVICE FROM CUTTING TOOLS

D•S is in use in hundreds of plants helping metal working people reduce perishable tool costs. This preferred method of relief grinding has now been made easy as angular relief and can be produced by any good cutter grinder hand.

Let us send our brochure telling the complete story on all models including the motorized D•S at left.

Angular Relief *Radial Relief*

D•S GRINDER DIV.

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